CALIFORNIA'S FOURTH
CLIMATE CHANGE
ASSESSMENT

Los Angeles Region Report

Coordinating Agencies:

GOVERNOR'S OFFICE OF PLANNING AND RESEARCH · STATE OF CALIFORNIA ·

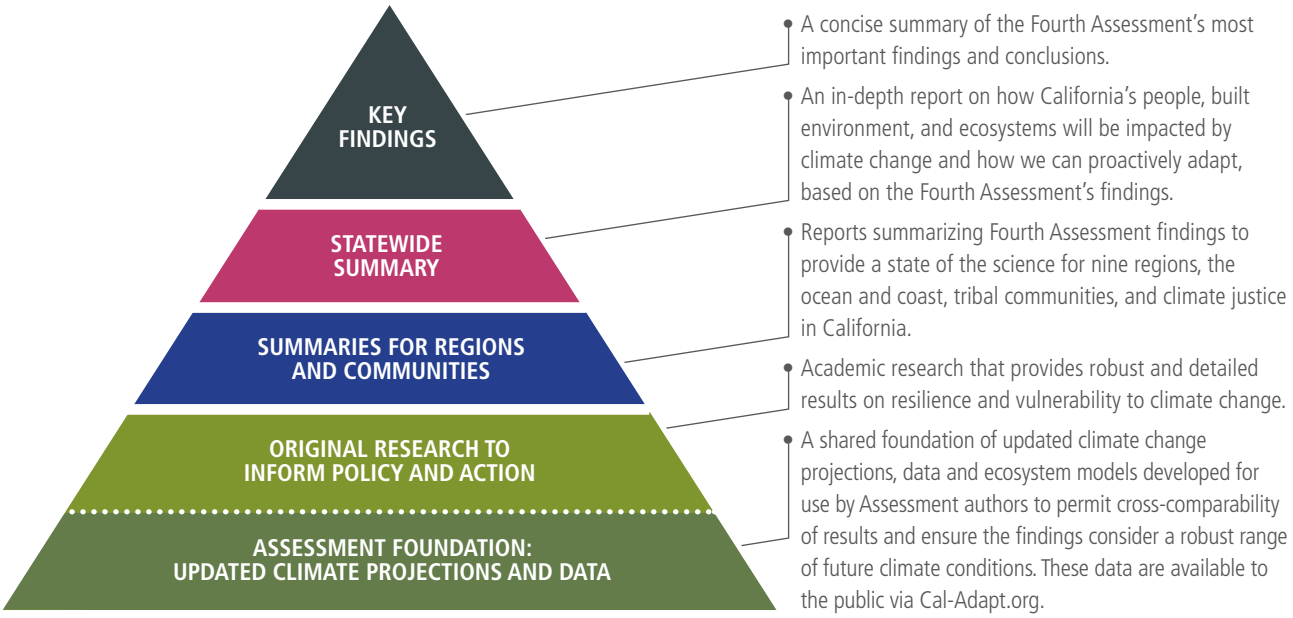
STATE OF CALIFORNIA ENERGY COMMISSION

CALIFORNIA natural resources AGENCY

Introduction to California's Fourth Climate Change Assessment

California is a global leader in using, investing in, and advancing research to set proactive climate change policy, and its Climate Change Assessments provide the scientific foundation for understanding climate-related vulnerability at the local scale and informing resilience actions. The Climate Change Assessments directly inform State policies, plans, programs, and guidance to promote effective and integrated action to safeguard California from climate change.

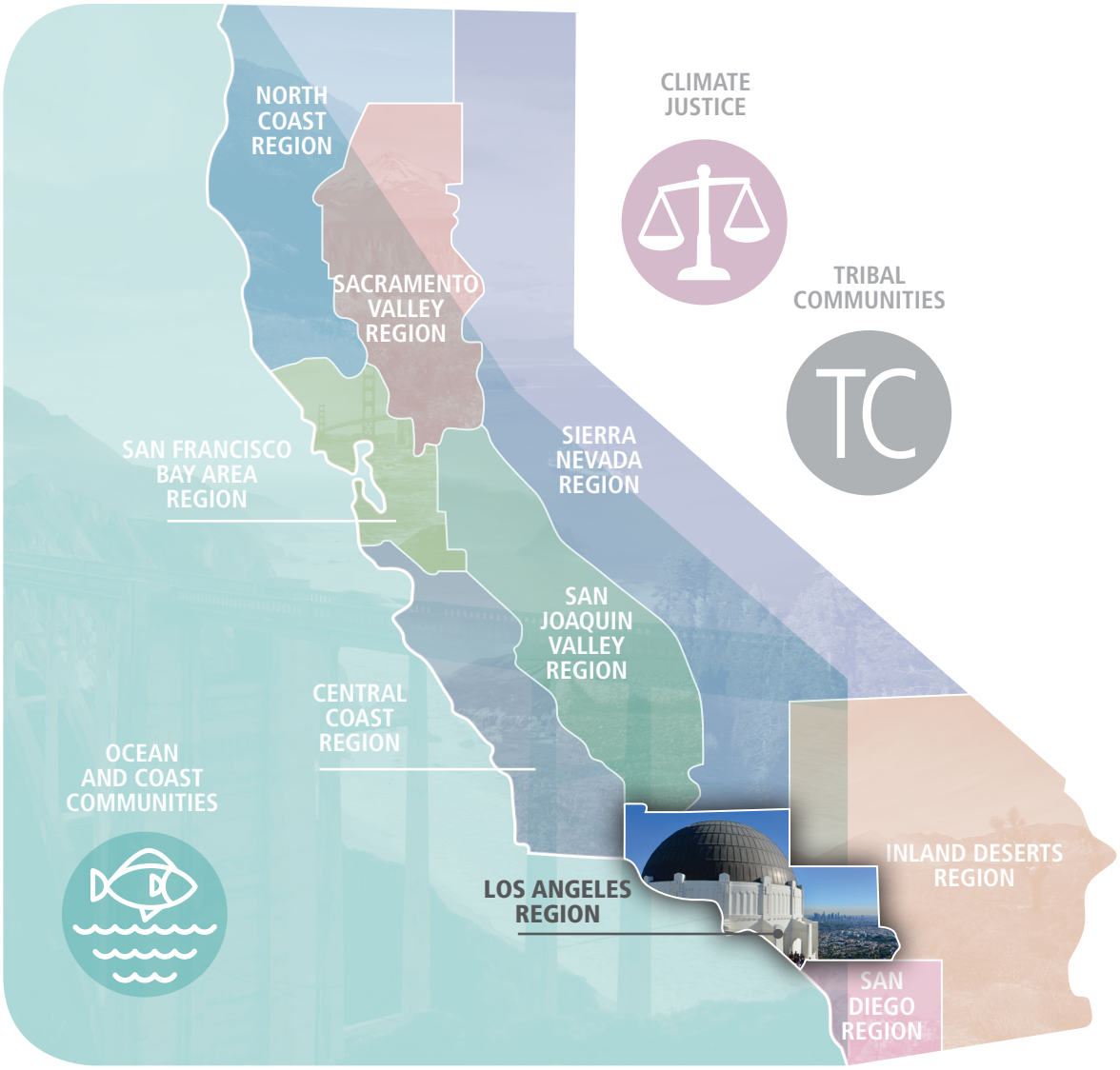
California's Fourth Climate Change Assessment (Fourth Assessment) advances actionable science that serves the growing needs of state and local-level decision-makers from a variety of sectors. This cutting-edge research initiative is comprised of a wide-ranging body of technical reports, including rigorous, comprehensive climate change scenarios at a scale suitable for illuminating regional vulnerabilities and localized adaptation strategies in California; datasets and tools that improve integration of observed and projected knowledge about climate change into decision-making; and recommendations and information to directly inform vulnerability assessments and adaptation strategies for California's energy sector, water resources and management, oceans and coasts, forests, wildfires, agriculture, biodiversity and habitat, and public health. In addition, these technical reports have been distilled into summary reports and a brochure, allowing the public and decision-makers to easily access relevant findings from the Fourth Assessment.


KEY FINDINGS
STATEWIDE SUMMARY
SUMMARIES FOR REGIONS AND COMMUNITIES
ORIGINAL RESEARCH TO INFORM POLICY AND ACTION
ASSESSMENT FOUNDATION: UPDATED CLIMATE PROJECTIONS AND DATA
A concise summary of the Fourth Assessment's most important findings and conclusions.
An in-depth report on how California's people, built environment, and ecosystems will be impacted by climate change and how we can proactively adapt, based on the Fourth Assessment's findings.
Reports summarizing Fourth Assessment findings to provide a state of the science for nine regions, the ocean and coast, tribal communities, and climate justice in California.
Academic research that provides robust and detailed results on resilience and vulnerability to climate change.
A shared foundation of updated climate change projections, data and ecosystem models developed for use by Assessment authors to permit cross-comparability of results and ensure the findings consider a robust range of future climate conditions. These data are available to the public via Cal-Adapt.org.

All research contributing to the Fourth Assessment was peer-reviewed to ensure scientific rigor as well as, where applicable, appropriate representation of the practitioners and stakeholders to whom each report applies.

For the full suite of Fourth Assessment research products, please visit: www.ClimateAssessment.ca.gov

Los Angeles Region



The Los Angeles Region Summary Report is part of a series of 12 assessments to support climate action by providing an overview of climate-related risks and adaptation strategies tailored to specific regions and themes. Produced as part of California's Fourth Climate Change Assessment as part of a pro bono initiative by leading climate experts, these summary reports translate the state of climate science into useful information for decision-makers and practitioners to catalyze action that will benefit regions, the ocean and coast, frontline communities, and tribal and indigenous communities.

The Los Angeles Region Summary Report presents an overview of climate science, specific strategies to adapt to climate impacts, and key research gaps needed to spur additional progress on safeguarding the Los Angeles Region from climate change.

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CITATION: Hall, Alex, Neil Berg, Katharine Reich. (University of California, Los Angeles). 2018. ***Los Angeles Summary Report***. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-007.

Disclaimer: This report summarizes recent climate research, including work sponsored by the California Natural Resources Agency and California Energy Commission. The information presented here does not necessarily represent the views of the funding agencies or the State of California.

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Highlights

The Los Angeles (LA) region contains all of Ventura, LA, and Orange Counties, along with adjacent urbanized portions of San Bernardino and Riverside Counties. Topography in the region includes a large swath of coastal plains along the Pacific Ocean; the Santa Monica, San Gabriel, San Bernardino, Santa Ana, and San Jacinto Mountains; along with the western tip of the Mojave Desert in the Antelope Valley of northern LA County. Home to roughly 18 million people and growing, this region contains approximately half the population of California, and has a higher population than 45 other states. Countless ecosystems thrive throughout the region's coasts, mountains, and interior landscapes. The region also has immense economic value to California and the nation, including its entertainment and digital media industries, international trade through the Ports of LA and Long Beach, defense contracting, medicine, and a growing high-tech sector. Therefore, it is imperative to ensure that the human, economic, and natural systems across the LA region continue to thrive under a changing future climate.

Key projected climate changes include:

- Continued future warming over the LA region. Across the region, average maximum temperatures are projected to increase around 4-5 degrees F by the mid-century, and 5-8 degrees F by the late-century.
- Extreme temperatures are also expected to increase. The hottest day of the year may be up to 10 degrees F warmer for many locations across the LA region by the late-century under RCP8.5. The number of extremely hot days is also expected to increase across the region.
- Despite small changes in average precipitation, dry and wet extremes are both expected to increase. By the late-21st century, the wettest day of the year is expected to increase across most of the LA region, with some locations experiencing 25-30% increases under RCP8.5. Increased frequency and severity of atmospheric river events are also projected to occur for this region.
- Sea levels are projected to continue to rise in the future, but there is a large range based on emissions scenario and uncertainty in feedbacks in the climate system. Roughly 1-2 feet of sea level rise is projected by the mid-century, and the most extreme projections lead to 8-10 feet of sea level rise by the end of the century.
- Projections indicate that wildfire may increase over southern California, but there remains uncertainty in quantifying future changes of burned area over the LA region.

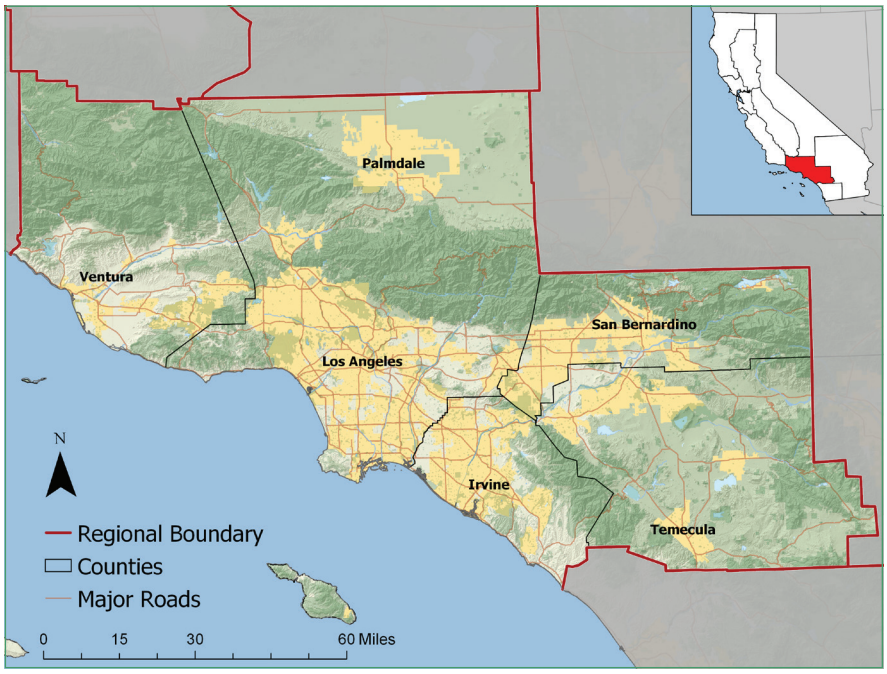
Introduction to the Region and Report

The Los Angeles (LA) region contains all of Ventura, LA, and Orange Counties, along with adjacent urbanized portions of San Bernardino and Riverside Counties (Figure 1). Topography in the region includes a large swath of coastal plains along the Pacific Ocean; the Santa Monica, San Gabriel, San Bernardino, Santa Ana, and San Jacinto Mountains; along with the western tip of the Mojave Desert in the Antelope Valley of northern LA County. Home to roughly 18 million people and growing, this region approximately contains half the population of California, and has a greater population than 45 other states. The region also has immense economic value to California and the nation, including its entertainment and digital media industries, international trade through the Ports of LA and Long Beach, defense contracting, medicine, and a growing high-tech sector.

The region is characterized by a Mediterranean climate with hot, dry summers and cool, wet winters. This famously pleasant climate influences all aspects of life in the LA region. Countless ecosystems thrive throughout the region's coasts, mountains, and interior landscapes. Substantial agricultural production occurs here, taking advantage of the bountiful sunshine and generally warm temperatures. Snow-based water from the Sierra Nevada (and Colorado Rockies) have, to date, largely satisfied the region's huge residential, industrial, agricultural, and ecological freshwater demands. A complex web of generation and transmission systems has also provided enough energy to power to the region's vast population. Cars, and especially solo driver traveling, remain the primary mode of transportation, leading to notoriously congested roadways with related problems of poor air quality blanketing the region.

Despite the region's overall prosperity, there remain significant environmental injustices. Large vulnerable communities, notably those that are economically disadvantaged – including racial and ethnic minorities, the elderly, and the homeless – are currently exposed to harmful environmental conditions. These include polluted air, water sources, and landscapes, in addition to heat stress.

FIGURE 1



Los Angeles region topography and boundary definition as a solid red line, which encompasses Los Angeles, Ventura, and Orange Counties, and adjacent urbanized portions of San Bernardino and Riverside Counties.

In fact, the region contains some of the most vulnerable neighborhoods in all of California, including much of East and South LA, Pomona, and Ontario. Future climate changes, especially increases in extreme heat, are expected to disproportionately burden low-income residents and communities of color across the region.

It is imperative to ensure that the human, economic, and natural systems across the LA region continue to thrive under a changing future climate. The LA Regional Collaborative for Climate Action and Sustainability (http://www.laregionalcollaborative.com/) and a handful of climate action plans within the region have already begun to organize and plan for these changes. Alongside these frameworks, this report summarizes the current understanding of projected local climate changes, and their impacts to public health, energy, transportation, land use, emergency management, vegetation and flora, oceans and coasts, agriculture, and water in the region. Examples of how the region has already adapted, or is planning to adapt, to new climate conditions are also included where available in certain sections of the report. They serve as clear examples that increasing the resiliency and sustainability of the LA region under a changing climate is a challenging yet achievable task. Overall, we intend for this report to serve as a summary of the latest science and impacts of regional climate change for stakeholders, policymakers, local officials, and others to consider in their decisions to help mitigate and adapt to these changes.

Regional Climate Science

In this section, we begin by briefly describing the climate and sea level projections developed for the Fourth Assessment that are examined for the LA region in this report. We then synthesize literature on observed changes and projected future changes to key aspects of the region's climate: temperature, precipitation, extreme storms, Santa Ana winds, sea level, wildfire, drought, clouds, humidity, and air quality.

Climate and Sea Level Rise Datasets

For the Fourth Assessment, Cayan et al. (2018) downscaled daily temperature and precipitation projections from 32 global climate models (GCMs) over California to a spatial resolution of 1/16° (around 6 km, or 3.7 miles) using a method called Localized Constructed Analogues (Pierce et al. 2014). 10 of the 32 downscaled GCMs were found to best simulate important aspects of California's climate and this subset of GCMs are used for analyses and figures in this report. The dataset includes a historical period of 1950-2005 and then two future projections spanning 2006-2100 based on two greenhouse gas emissions scenarios - Representative Concentration Pathways (RCP) 4.5 and 8.5. RCP4.5 represents a mitigation scenario where global CO2 emissions peak by 2040, while RCP8.5 represents a "business-as-usual" scenario where CO2 emissions continue to rise throughout the 21st century (van Vuuren et al. 2011). Public access to the downscaled data, along with mapping and other visualization tools, can be found at www.cal-adapt.org. Some caveats must be applied when interpreting the LOCA projections. The LOCA statistical downscaling procedure assumes persistence in the fundamental physics that drive spatial gradients across the region. Thus, future changes in sea breeze, clouds, and other local processes that could have important implications for spatial patterns of changes in temperature and precipitation are not captured in these projections.

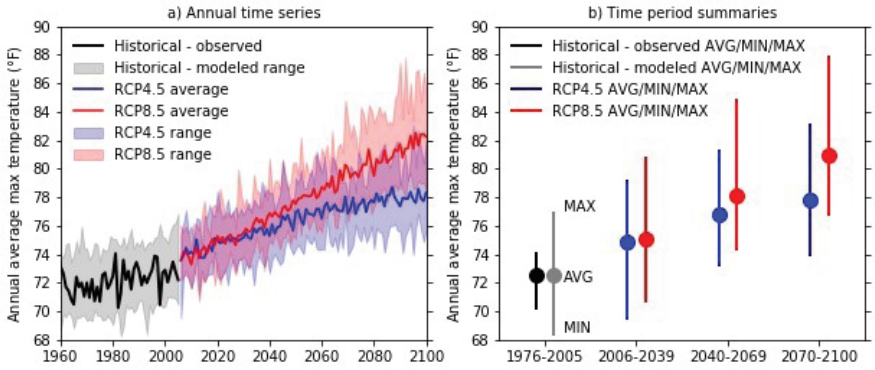
California-specific sea level rise projections were also developed for the Fourth Assessment (Cayan et al. 2018). Projections were generated under RCP4.5 and RCP8.5 scenarios using a probabilistic approach to estimate components that contribute to global and regional sea level rise, including possible contributions from Antarctica. Hourly sea level rise projections were also developed for selected coastal locations that include tides, regional and local weather influences, and short period Pacific climate fluctuations, along with the statewide sea level rise scenarios.

Temperature

Observations over the past century indicate that temperature has increased across southern California. Based on 1896-2015 temperature records for the California South Coast NOAA Climate Division, which encompasses the LA region, He and Gautam (2016) found significant trends in annual average, maximum, and minimum temperature around 0.16°C per decade. Every month has experienced significant positive trends in monthly average, maximum, and minimum temperature. Monthly average and minimum temperatures have increased the most in September and monthly maximum temperatures have increased the most in January, with each trend exceeding 0.2°C per decade. Recently, the California South Coast Climate Division has experienced sustained record warmth. The top 5 warmest years in terms of annual average temperature have all occurred since 2012: 2014 was the warmest, followed by 2015, 2017, 2016, and 2012 (data can be accessed at https://www.ncdc.noaa.gov/temp-and-precip/climatological-rankings/).

Warming is expected to increase across the LA region in the coming decades (Cayan et al. 2008; Horton et al. 2015; Swain et al. 2016; Maurer 2007; Hayhoe et al. 2004; Sun, Walton, and Hall 2015). Figure 2 shows projected changes in annual average daily maximum temperature using data sets developed for the Assessment. Figure 2a displays the annual averages for 1960-2005 using historical observations and model simulations, alongside 2006-2100 annual averages based on 10 downscaled GCM projections under RCP4.5 and 8.5. Figure 2b summarizes the continuous time series in Fig. 2a by noting the average annual-mean, along with the maximum and minimum annual-mean, across four time periods: 1976-2005 (historical), 2006-2039 (early-21st century), 2040-2069 (mid-21st century), and 2070-2100 (late 21st century). Projections are similar during the early-21st century regardless of emissions scenario. Only later in the 21st century do the projections diverge, as emissions continue to rise under RCP8.5, while they plateau in the mid-century under RCP4.5. Specifically, compared to the modeled historical annual average maximum temperature of 72.5°F, future model-average values are projected to increase to 74.8°F (model range of 69.5 - 79.1°F) by the early-21st century, 76.7°F (73.3 - 81.2°F) by the mid-21st century, and 77.8°F (74.0 - 83.1°F) by the late-21st century under RCP4.5 (blue dots and lines, Figure 2b). Corresponding model-average projections under RCP8.5 are 75.1°F (70.7 - 80.7°F) by the early-21st century, 78.2°F (74.4 - 84.8°F) by the mid-21st century, and 80.9°F (76.9 - 87.8°F) by the late-21st century (red dots and lines, Fig. 2b). Note that the data in Figure 2 combines inter-annual variability and model variability, resulting in apparent increases in future variability over the region.

FIGURE 2

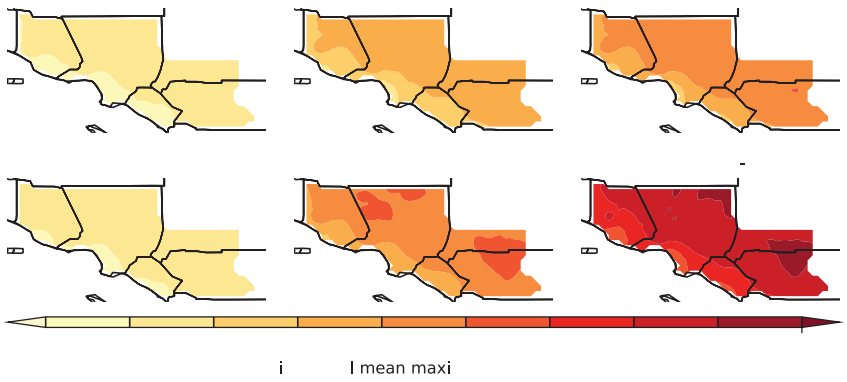


Historical-observed (black), historical-modeled (grey), and projected future (RCP4.5 - blue, RCP8.5 - red) annual average maximum temperature over the LA region. (a) Annual time series of data (future projections begin in 2006), with solid lines representing model-averages and shading representing model spread. (b) Summary of model-average (circles) and spread (vertical lines) across four time periods: 1976-2005 (historical), 2006-2039 (early-21st century), 2040-2069 (mid-21st century), and 2070-2100 (late-21st century). Unit is °F.

Clear spatial patterns are found in projected annual maximum temperature changes (Figure 3). Coastal regions in Ventura, LA, and Orange Counties are projected to experience relatively lower amounts of warming as the ocean provides a buffering effect to these areas. Interior regions are expected to experience the highest amounts of warming, up to 10°F in the late-21st century under RCP8.5. Projected annual temperature changes in Figures 2 and 3 are consistent with other recent studies. Using a different downscaling approach that examined changes across 35 GCMs, Sun et al. (2015) projected annual mean temperature changes over the greater LA region to be slightly over 2°C and 4°C by the mid- and end-of-century, respectively, under RCP8.5.

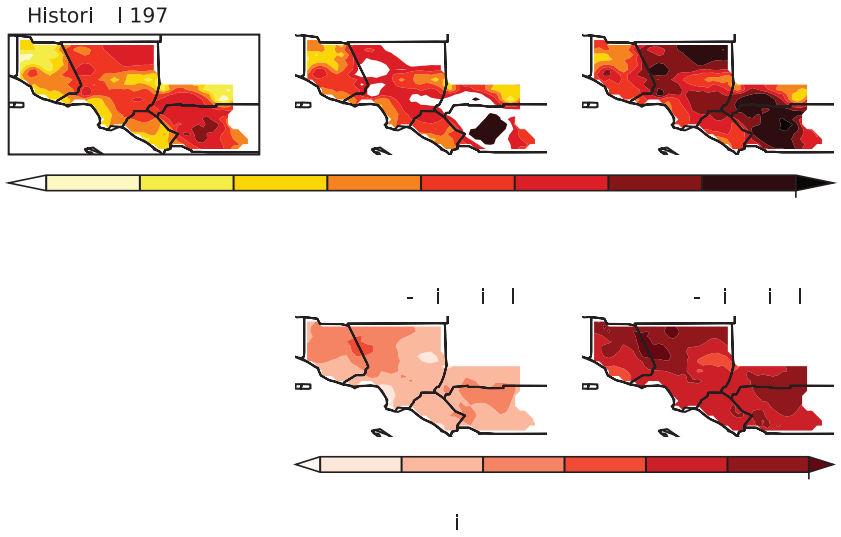
The intensity and frequency of extreme heat are also projected to increase over the LA region. The average hottest day of the year is expected to increase roughly 4-7°F under RCP4.5 and 7-10°F under RCP8.5 by the late-21st century (bottom row, Figure 4). Similar to the spatial pattern in annual max temperature changes, the largest changes in extremes are found in the interior of the region, and particularly the valleys, while the smallest changes are generally confined to coastal regions.

FIGURE 3



Spatial patterns of projected model-average change in annual mean maximum temperature under RCP4.5 and RCP8.5 for three time periods: 2006-2039 (early-21st century), 2040-2069 (mid-21st century), and 2070-2100 (late 21st-century). Unit is °F.

FIGURE 4



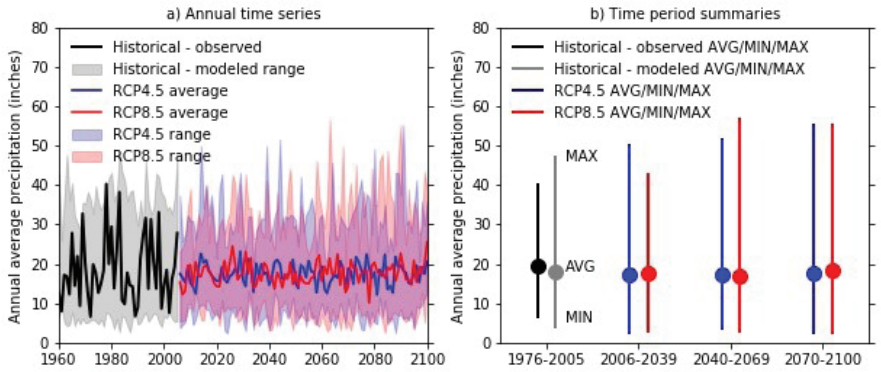
Top row: Average hottest day of the year in the historical (1976-2005) period, and in the late-21st century (2070-2100) under RCP4.5 and RCP8.5. Bottom row: change (late-21st century minus historical) in the hottest day of the year under RCP4.5 and RCP8.5. Unit is °F.

The number of extremely hot days is expected to increase in the future. For instance, LA International Airport (LAX) historically experiences less than 15 days per year with temperatures equal to or greater than 90°F (Cayan et al. 2018). By the end of the century under RCP8.5, LAX is projected to experience 50–90 such days per year (Pierce et al. 2018). Sun et al. (2015) similarly found that land locations are projected to experience 60–90 additional extremely hot days (greater than or equal to 95°F) per year by the end of the century, with the exception of the highest elevations and regions along the coast, where increases are only a few days.

Precipitation

Precipitation over the LA region is highly variable from year to year (black line in Figure 5a, Dettinger et al. 2011; Mitchell and Blier 1997) and only about five storms each year make up 50% of the annual precipitation total. Natural climate variability phenomena, such as the El Niño-Southern Oscillation, can influence the amount of precipitation that the region receives (Hoell et al. 2016), but there are no clear trends in historical precipitation for this region (Fig. 5a, He and Gautam 2016; Seager et al. 2014).

FIGURE 5

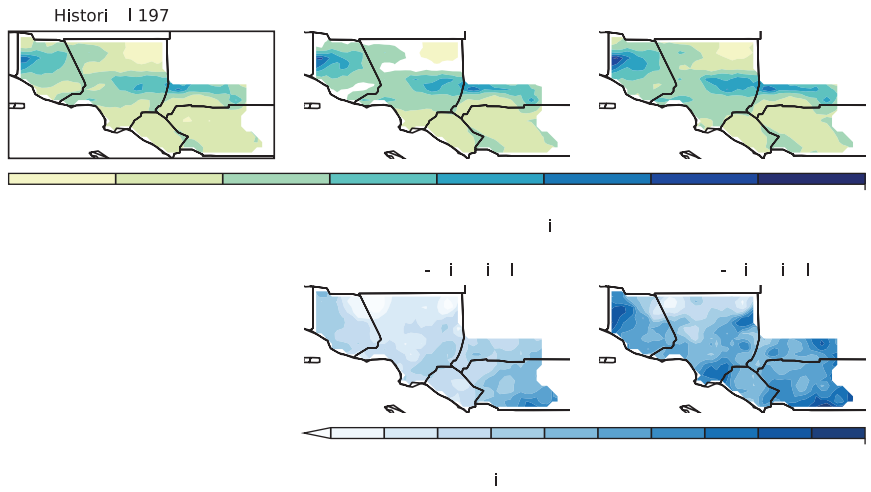


Historical observed (black), historical modeled (grey), and projected future (RCP4.5 - blue, RCP8.5 - red) annual average precipitation over the LA region. (a) Annual time series (historical: 1960-2005, RCP4.5/RCP8.5: 2006-2100), with solid lines representing model averages and shading representing spread across models. (b) Summary of model averages (circles) and spread (vertical lines) across four time periods: 1976-2005 (historical), 2006-2039 (early-21st century), 2040-2069 (mid-21st century), and 2070-2100 (late-21st century). Unit is inches.

Southern California lies between two large-scale zones of opposing projected precipitation change: general wetting in the northern mid-latitudes versus general drying in the southern sub-tropics (Guzman-Morales et al. 2016a; Hughes and Hall 2009a; Held and Soden 2006; Chou and David Neelin 2004; Trenberth 2011). Consequently, model projections disagree on the sign of future precipitation change over southern California, but generally project small mean changes (either positive or negative) compared to the region's large historical variability (Figure 6, Berg et al. 2015; Neelin et al. 2013; Pierce et al. 2012; Maurer 2007; Hayhoe et al. 2004).

Despite small changes in average precipitation, dry and wet extremes are both expected to increase in the future (Polade et al. 2014; Swain et al. 2018). By the late-21st century, the wettest day of the year is expected to increase across most of the LA region, with some locations experiencing 25-30% increases under RCP8.5 (Figure 6, lower panel). Extreme precipitation often arrives via "atmospheric rivers", and possible changes to these and other extreme storms are discussed further in the subsequent section. Extremely dry years are also projected to increase over southern California, potentially a doubling or more in frequency by the late-21st century (Swain et al. 2018).

FIGURE 6



Top row: Average wettest day of the year in the historical (1976-2005) period and in the late-21st century (2070-2100) under RCP4.5 and RCP8.5. Unit is inches. Bottom row: change (late-21st century minus historical) in the wettest day of the year under RCP4.5 and RCP8.5. Unit is percent.

Extreme Storms

Atmospheric rivers are regions of high water vapor transport from the tropics to the Pacific Coast of the U.S. that can produce intense topographic-induced precipitation along southern California mountain ranges (Neiman et al. 2008; J. Kim et al. 2012; Harris and Carvalho 2017; Guan et al. 2013; Payne and Magnusdottir 2014). Such events have helped pull the region out of droughts, although they are also responsible for devastating floods and mudslides (Ralph et al. 2006; Guan et al. 2013; M. D. Dettinger 2013). Between 1979-2013, 72 atmospheric rivers were identified as landfalling along the coast of southern California, approximately 2-3 events each year, though significant interannual variability exists. The frequency of atmospheric rivers over southern California has a potential connection to some natural climate variability patterns (Neiman et al. 2008; J. Kim et al. 2012; Harris and Carvalho 2017; Guan et al. 2013; Payne and Magnusdottir 2014).

Analysis of several previous-generation GCMs by (Dettinger 2011a) suggest that the frequency of atmospheric river events may increase in the future, and that the storms themselves will be associated with higher water vapor transport rates compared to historical conditions. Moreover, the peak season of atmospheric rivers may also lengthen, which could extend the flood-hazard season in California. The current generation of GCMs project a nearly 40% increase in precipitation during atmospheric river events over southern California by the late-21st century under RCP8.5. The number of atmospheric river events is also projected to increase in the future, possibly around a doubling of days by the end of the century (Warner et al. 2015; Hagos et al. 2016; Gao et al. 2015). Understanding future characteristics of atmospheric rivers, particularly over local spatial scales in California, remains an active area of research.

Santa Ana Winds

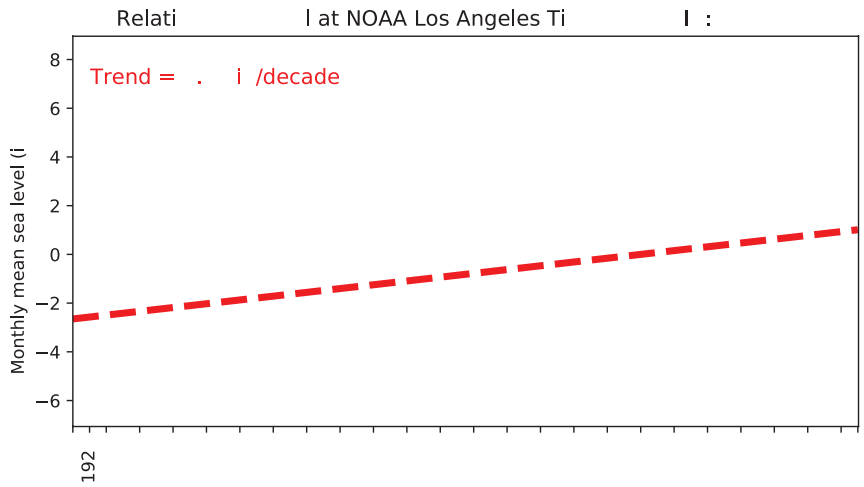
Characterized by strong northeasterly downslope and offshore flows, Santa Ana winds are a unique climatic feature during October to April in southern California. Very dry air associated with these winds can be catalysts for wildfire outbreaks in the region, notably the recent Thomas Fire in Ventura County in December 2017. Santa Ana winds tend to be most frequent in December, yet strongest in January (Guzman-Morales et al. 2016a; Hughes and Hall 2009a; Hughes, Hall, and Kim 2011a; Conil and Hall 2006). Significant interannual variability exists for these events, and there is evidence that their intensity may be connected with low-frequency climate variability patterns, such as the El Niño-Southern Oscillation and the Pacific Decadal Oscillation. However, no significant trends in intensity, duration, or frequency of Santa Ana winds have been detected during 1948-2010 (Guzman-Morales et al. 2016a; Hughes and Hall 2009a; Hughes et al. 2011a).

There is uncertainty in future changes to Santa Ana events. One study that examined two global climate models found an increase in future Santa Ana events, though others have found that the number of Santa Ana events may decrease around 20% in the future, as relatively greater warming over the interior land masses may weaken the ocean-to-desert temperature gradient that partly drives Santa Ana winds (Guzman-Morales et al. 2016b; Hughes and Hall 2009b; Hughes et al. 2011b; N. L. Miller and Schlegel 2006). Downscaling future wind fields and understanding their response to anthropogenic forcings remains a challenge and requires greater research going forward.

Sea Level Rise

Over the last century, ocean thermal expansion was the largest contributor to global mean sea level rise with secondary contributions from melting mountain glaciers and ice caps, and loss of ice sheets covering Greenland and Antarctica. Vertical land motion, along with changes in ocean and atmospheric phenomena, further influence local or relative sea level rise along the California coastline (Griggs et al. 2017). Figure 7 displays the observed record of monthly mean sea level at the NOAA LA gauge from 1924 through 2017. While substantial annual variability exists, a statistically significant ($p < 0.001$) linear trend of 0.39 inches per decade is found during this time period.

FIGURE 7



1924-2017 monthly mean sea level (with average seasonal cycle removed) for the NOAA Los Angeles tide gauge (grey line) and the long-term linear trend (red dashed line). Values are relative to the most recent Mean Sea Level datum established by CO-OPS. Data can be accessed at https://tidesandcurrents.noaa.gov/stationhome.html?id=9410660.

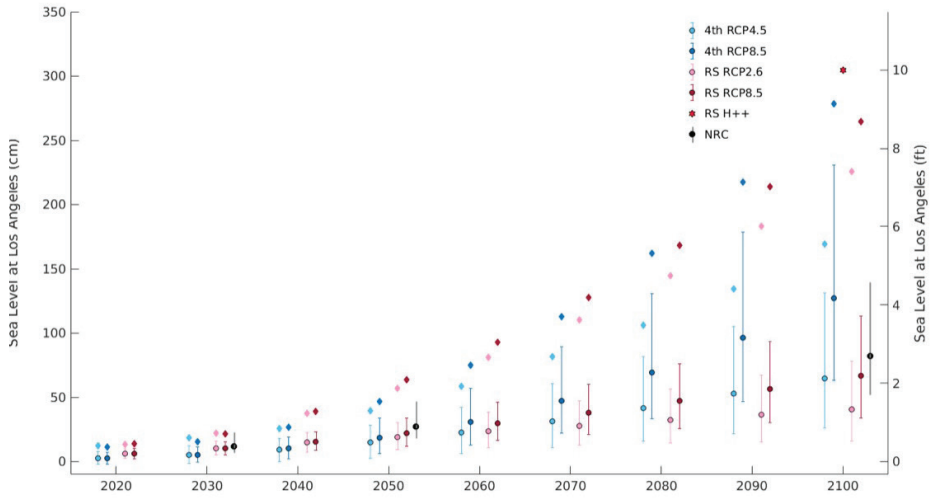
Sea levels are projected to rise in the future. The Fourth Assessment adopted probabilistic sea level rise projections following the method of Kopp et al. (2014) and incorporated new ice sheet dynamics for Antarctica, which include processes that could cause Antarctica to contribute significantly more to global sea level than previously thought (DeConto and Pollard 2016). Sea level rise projections developed for the Fourth Assessment include RCP4.5 and RCP8.5 emissions scenarios. The Rising Seas Report (Griggs et al. 2017), which is considered the state of the science for sea level rise in California, also produced sea level rise projections for the lowest scenario, RCP2.6, and includes an extreme sea level rise scenario called the H++.

Figure 8 displays sea levels for each decade remaining in the 21st century based on the probabilistic projections developed by the Fourth Assessment ("4th RCP4.5" [light blue lines] and "4th RCP8.5" [dark blue lines]), the Rising Seas projections ("RS RCP2.6 [pink lines], "RS RCP8.5" [dark red lines], and "RS H++" [red star in year 2100]). Uncertainty ranges are available for the Fourth Assessment RCP4.5 and 8.5 projections, along with the Rising Seas RCP2.6 and RCP8.5 projections. These uncertainty ranges are summarized by each dataset's 5th, 50th, 95th, and 99.9th percentiles. For additional reference, sea level rise projections and uncertainty for just the year 2100 according to the National Research Council are also shown (black dot and grey line in year 2100).

Focusing on the Assessment projections, differences between RCP4.5 and RCP8.5 begin to clearly emerge in the second half of the 21st century. Continued emissions and warmer future temperatures under RCP8.5 lead to drastically higher sea level rise projections compared to RCP4.5, especially by the end of the century. Specifically, the Fourth Assessment projects the 5th, 50th, and 95th percentiles of 2050 sea level rise to be 1.1, 5.9, and 11.1 inches under RCP4.5, with corresponding values of 2.3, 7.3, 13.3 inches under RCP8.5. By 2100, the 5th, 50th, and 95th values are 10.2, 25.4, and 51.7 inches under RCP4.5, and 24.8, 50.2, and 90.9 inches under RCP8.5. Differences between the Fourth Assessment and Rising Seas projections are also small until 2050. RCP8.5 projections by the Assessment are generally higher than corresponding projections by Rising Seas, and the ranges of projections for each dataset highlight that large uncertainty remains about how ice sheets and feedbacks in the climate system will respond to much warmer future temperatures.

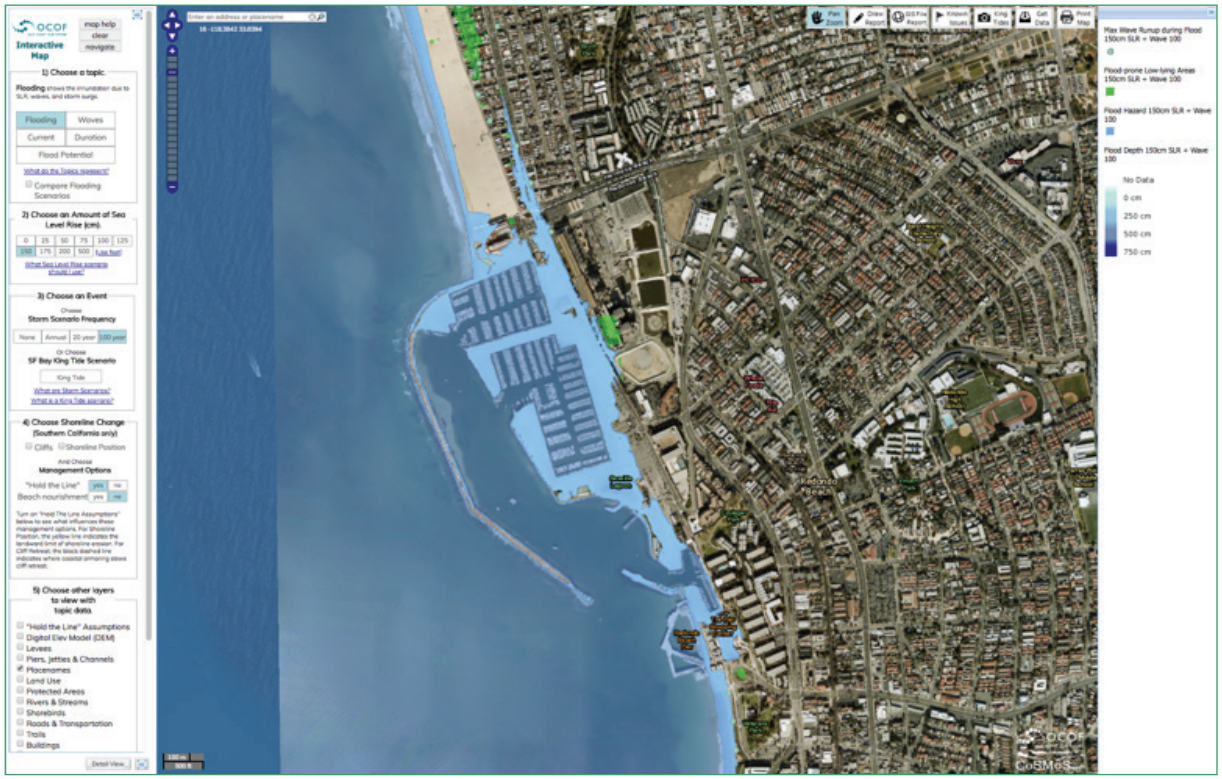
Wide sandy beaches comprise much of the LA coastline. Therefore, in addition to sea level rise, the impacts of wave events from coastal storms is another important climate change consideration for this region. Recognizing the need to have projections of sea level rise in combination with coastal storms, the Fourth Assessment provided funding to complete the development of the USGS Coastal Storm Modeling System (CoSMos, O'Neill et al. 2018; Erikson et al. 2018) for the South Coast (Pt. Conception to the U.S./Mexico border). CoSMoS is a dynamic

FIGURE 8



Los Angeles 21st-century sea level rise estimates for each decade based on: Fourth Assessment RCP4.5 (light blue) and RCP8.5 (dark blue), Rising Seas RCP2.6 (pink), Rising Seas RCP8.5 (dark red), and Rising Seas H++ in 2100 (red star). NRC is represented by the black dots and grey lines in 2100. Each decade's estimate is shown as a range from 5th to 95th with the circle representing the 50th percentile and diamond representing the 99.9th percentile. (Figure provided by Julie Kalansky.)

modeling approach that provides detailed predictions of coastal flooding due to both future sea level rise and storms integrated with long-term coastal evolution (i.e., beach changes and cliff/bluff retreat) over large geographic areas (hundreds of kilometers). CoSMoS models all the relevant physics of a coastal storm (e.g., tides, waves, and storm surge), which are then scaled down to local flood projections for use in community-level coastal planning and decision-making. Rather than relying on historic storm records, CoSMoS uses wind and pressure from global climate models to project coastal storms under changing climatic conditions during the 21st century. 40 different projections of sea level rise (0 - 2 meters and 5 meters at 0.25 m increments) and 4 storm scenarios (no storm, annual storm, 20-year return interval and 100-year return interval) are available for the LA region. One scenario is displayed in Figure 9, showing flooding for Redondo Beach based on projections of 4.9 ft (1.5 m) of sea level rise with a concurrent 100-year coastal storm.



Projections of 4.9 ft (1.5 m) of sea level rise with a concurrent 100-year coastal storm for Redondo Beach, CA. These data are publicly-available via the Our Coast, Our Future viewer, also funded by The Fourth Assessment.

Conclusion

Climate change is expected to significantly impact the LA region. Warmer average and extreme temperatures, increased precipitation extremes, and rising sea levels are expected to occur. Future changes in Santa Ana winds, wildfire, coastal clouds, and air quality are less certain, but new integrated models and observational datasets are expected to advance our understanding of these aspects of climate change.

The LA region has already taken steps to prepare for a changing climate, but deeper understanding, smart planning, and ample financial and human resources will be needed to fully cope with these changes. Increased resources are needed for local health departments to model and respond to climate-related public health impacts and to train healthcare professionals on best practices for how to teach patients to protect themselves from climate impacts. Community vulnerabilities to climate change must be considered as local and regional agencies update emergency response plans and operations. Continued growth in renewable energy and investment in new energy infrastructure will be needed to handle projected increases in electricity consumption for many locations in the LA region. Reducing the region's carbon emissions and increasing mobility for its residents can be accomplished through targeted upgrades and new infrastructure to LA's transportation system. Planting trees can reduce the urban heat island and improve air quality for the region, but dedicated funding to increase the planting of new trees and maintenance of existing ones is needed to realize their full benefits. Longitudinal studies of changes in urban landscaping will need to be conducted to understand if, and how, turf replacement programs affect water use and other aspects in the region. Numerous ecosystems will be impacted by a range of climate changes, and refined projections of wildfire, in particular, and better integration of climate and species models will help inform how to best manage and preserve LA's magnificent ecological web. Advances in water-efficient irrigation systems, alongside shifts towards more water- and energy-sustainable farming practices, are needed to ensure that the region's profitable crops can thrive in a warmer future. Climate change will further complicate the challenging task of satisfying freshwater demands across the LA region. Improved integration of climate change into water management models, along with significant infrastructural investments to augment local water supplies and shifts, will help to maintain water resources for residential, commercial, and agricultural, and recreational purposes.

While models are a valuable tool for decision-making, the importance of building capacity within communities to engage in climate adaptation decisions cannot be overstated. Creating opportunities for robust stakeholder participation in planning processes and development decisions helps to raise awareness of climate impacts, builds a common understanding of key vulnerabilities, and allows local perceptions and preferences to guide the selection of adaptation strategies. Climate change is only one of many issues that threaten the health and prosperity of communities of the LA region, but as described above, it will affect nearly all aspects of life in the region, including ecosystems, the built environment, and public health. Therefore, greater effort should be invested in integrating climate change into existing planning and decision-making processes that traditionally have excluded climate change considerations. The more climate change is taken into account in long-term decisions, especially those regarding infrastructure and development projects, the better communities will be prepared to cope with climate change impacts in the future.

References

Abu-Allaban, Mahmoud, John A. Gillies, Alan W. Gertler, Russ Clayton, and David Proffitt. 2003. "Tailpipe, Resuspended Road Dust, and Brake-Wear Emission Factors from on-Road Vehicles." *Atmospheric Environment* 37 (37): 5283–93.

AdaptLA, 2013. Physical Vulnerability Assessment Findings Final Report, https://dornsife.usc.edu/assets/sites/291/docs/AdaptLA_Physical_Vulnerability_Assessment_FINAL_05-03-13.pdf

AghaKouchak, Amir, Linyin Cheng, Omid Mazdiyasni, and Alireza Farahmand. 2014. "Global Warming and Changes in Risk of Concurrent Climate Extremes: Insights from the 2014 California Drought." *Geophysical Research Letters* 41 (24): 8847–52.

Akbari, Hashem, Surabi Menon, and Arthur Rosenfeld. 2009. "Global Cooling: Increasing World-Wide Urban Albedos to Offset CO2." *Climatic Change* 94 (3-4): 275–86.

Akbari, H., M. Pomerantz, and H. Taha. 2001. "Cool Surfaces and Shade Trees to Reduce Energy Use and Improve Air Quality in Urban Areas." *Solar Energy* 70 (3): 295–310.

Albrecht G. 2011. Chronic environmental change: Emerging "psychoterratic" syndromes. In: Weissbecker I (ed.). *Climate change and human well-being: Global challenges and opportunities*. New York, NY: Springer. pp. 43–56.

Allen, Preston K., and Gordon L. Elser. 1979. "They Said It Couldn't Be Done - the Orange County, California Experience." *Desalination* 30 (1): 23–38.

Allen, Robert J., and Rainer Luptowitz. 2017. "El Niño-like Teleconnection Increases California Precipitation in Response to Warming." *Nature Communications* 8 (July): 16055.

American Housing Survey. 2015. 2015 Los Angeles-Long Beach - Heating, Air Conditioning, and Appliances - All Occupied Units (data table). Retrieved from https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html#?s_areas=a31080&s_year=m2015&s_tableName=Table3&s_byGroup1=a1&s_byGroup2=a1&s_filterGroup1=t1&s_filterGroup2=g1&s_show=S

American Lung Association. 2017. State of the Air 2017: Most Polluted Cities. Retrieved from http://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/most-polluted-cities.html

American Wind Energy Association (AWEA) 2018: Wind Energy in California, http://awea.files.cms-plus.com/FileDownloads/pdfs/California.pdf.

Anderson, Jamie, Francis Chung, Michael Anderson, Levi Brekke, Daniel Easton, Messele Ejeta, Roy Peterson, and Richard Snyder. 2007. "Progress on Incorporating Climate Change into Management of California's Water Resources." *Climatic Change* 87 (S1): 91–108.

Auffhammer, Maximilian. (University of California, Berkeley and NBER). 2018. ***Climate Adaptative Response Estimation: Short and Long Run Impacts of Climate Change on Residential Electricity and Natural Gas Consumption Using Big Data.*** California's Fourth Climate Change Assessment, California Energy Commission. Publication number: CCCA4-EXT-2018-005.

Auffhammer, Maximilian, and Anin Aroonruengsawat. 2011. "Simulating the Impacts of Climate Change, Prices and Population on California's Residential Electricity Consumption." *Climatic Change* 109 (S1): 191–210.

Auffhammer, Maximilian, and Erin T. Mansur. 2014. "Measuring Climatic Impacts on Energy Consumption: A Review of the Empirical Literature." *Energy Economics* 46: 522–30.

Balazs, Carolina L., and Rachel Morello-Frosch. 2013. "The Three R's: How Community Based Participatory Research Strengthens the Rigor, Relevance and Reach of Science." *Environmental Justice* 6 (1). https://doi.org/10.1089/env.2012.0017.

Barbour, Elisa, and Elizabeth A. Deakin. 2012. "Smart Growth Planning for Climate Protection: Evaluating California's Senate Bill 375." *Journal of the American Planning Association. American Planning Association* 78 (1): 70–86.

Bassett, Ellen, and Vivek Shandas. 2010. "Innovation and Climate Action Planning: Perspectives from Municipal Plans." *Journal of the American Planning Association. American Planning Association* 76 (4): 435–50.

Baxter, Lester W., and Kevin Calandri. 1992. "Global Warming and Electricity Demand." *Energy Policy* 20 (3): 233–44.

Bell, Michelle L., Richard Goldberg, Christian Hogrefe, Patrick L. Kinney, Kim Knowlton, Barry Lynn, Joyce Rosenthal, Cynthia Rosenzweig, and Jonathan A. Patz. 2007. "Climate Change, Ambient Ozone, and Health in 50 US Cities." *Climatic Change* 82 (1-2): 61–76.

Bell, Michelle L., Aidan McDermott, Scott L. Zeger, Jonathan M. Samet, and Francesca Dominici. 2004. "Ozone and Short-Term Mortality in 95 US Urban Communities, 1987-2000." *JAMA: The Journal of the American Medical Association* 292 (19): 2372–78.

Bell, Michelle L., Antonella Zanobetti, and Francesca Dominici. 2014. "Who Is More Affected by Ozone Pollution? A Systematic Review and Meta-Analysis." *American Journal of Epidemiology* 180 (1): 15–28.

Belmecheri, Soumaya, Flurin Babst, Eugene R. Wahl, David W. Stahle, and Valerie Trouet. 2015. "Multi-Century Evaluation of Sierra Nevada Snowpack." *Nature Climate Change* 6 (1): 2–3.

Berg, Neil, and Alex Hall. 2017. "Anthropogenic Warming Impacts on California Snowpack during Drought." *Geophysical Research Letters* 44 (5): 2511–18.

Berg, Neil, Alex Hall, Fengpeng Sun, Scott Capps, Daniel Walton, Baird Langenbrunner, and David Neelin. 2015. "Twenty-First-Century Precipitation Changes over the Los Angeles Region*." *Journal of Climate* 28 (2): 401–21.

Berko, Jeffrey, Deborah D. Ingram, Shubhayu Saha, and Jennifer D. Parker. 2014. "Deaths Attributed to Heat, Cold, and Other Weather Events in the United States, 2006-2010." *National Health Statistics Reports*, no. 76 (July): 1–15.

Bethel, Jeffrey W., and Renee Harger. 2014. "Heat-Related Illness among Oregon Farmworkers." *International Journal of Environmental Research and Public Health* 11 (9): 9273–85.

Bhatti, Mohinder S. 1999. "Riding in Comfort: Part II." *ASHRAE Journal* 41: 44–50.

Boarnet, Marlon G., Xize Wang, and Douglas Houston. 2017. "Can New Light Rail Reduce Personal Vehicle Carbon Emissions? A Before-After, Experimental-Control Evaluation in Los Angeles." *Journal of Regional Science* 57 (3): 523–39.

Bohannon, Richard W., and A. Williams Andrews. 2011. "Normal Walking Speed: A Descriptive Meta-Analysis." *Physiotherapy* 97 (3): 182–89.

Brekke, Levi D., Edwin P. Maurer, Jamie D. Anderson, Michael D. Dettinger, Edwin S. Townsley, Alan Harrison, and Tom Pruitt. 2009. "Assessing Reservoir Operations Risk under Climate Change." *Water Resources Research* 45 (4). https://doi.org/10.1029/2008wr006941.

Brekke, Levi D., Norman L. Miller, Kathy E. Bashford, Nigel W. T. Quinn, and John A. Dracup. 2004. "CLIMATE CHANGE IMPACTS UNCERTAINTY FOR WATER RESOURCES IN THE SAN JOAQUIN RIVER BASIN, CALIFORNIA." *Journal of the American Water Resources Association* 40 (1): 149–64.

Breslow, Paul B., and David J. Sailor. 2002. "Vulnerability of Wind Power Resources to Climate Change in the Continental United States." *Renewable Energy* 27 (4): 585–98.

Brotons, Lluís, Núria Aquilué, Miquel de Cáceres, Marie-Josée Fortin, and Andrew Fall. 2013. "How Fire History, Fire Suppression Practices and Climate Change Affect Wildfire Regimes in Mediterranean Landscapes." *PloS One* 8 (5): e62392.

Burillo. 2017b. "Electricity Demand Planning Forecasts Should Consider Climate Non-Stationarity to Maintain Reserve Margins during Heat Waves." *Applied Energy* 206: 267–77.

Burillo, Daniel, Mikhail V. Chester, Benjamin Ruddell, and Nathan Johnson. 2017a. "Electricity Demand Planning Forecasts Should Consider Climate Non-Stationarity to Maintain Reserve Margins during Heat Waves." *Applied Energy* 206: 267–77.

Burillo, Daniel, Mikhail Chester, Stephanie Pincetl, Eric Fournier, Katharine Reich, Alex Hall. (University of California Los Angeles). 2018. ***Climate Change in Los Angeles County: Grid Vulnerability to Extreme Heat.*** California's Fourth Climate Change Assessment, California Energy Commission. Publication number: CCCA4-CEC-2018-013.

California Air Resources Board. 2017. "California Greenhouse Gas Emission Inventory - 2017 Edition." https://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-15.pdf.

California Department of Food and Agriculture (2017). California Agricultural Statistics Review 2015-2016. https://www.cdfa.ca.gov/statistics/PDFs/2016Report.pdf

California Department of Public Health. 2018. *Aedes aegypti* and *Aedes albopictus* mosquitoes in California detection sites by County/City, updated February 2, 2018. Retrieved from https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/AedesDistributionMap.pdf

California Environmental Protection Agency (Cal/EPA) Environmental Justice Program Update 2016. California Environmental Protection Agency; Sacramento, CA, USA: (accessed March 7, 2018) https://calepa.ca.gov/wp-content/uploads/sites/62/2016/10/EnvJustice-Documents-2016yr-EJReport.pdf

California Office of Statewide Health Planning and Development, Hospital Discharge and Emergency Department Visit Data. 2017.

Carleton, Tamma A. 2017. "Crop-Damaging Temperatures Increase Suicide Rates in India." *Proceedings of the National Academy of Sciences* 114 (33): 8746–51.

Cayan, Daniel R., David W. Pierce, Julie F. Kalansky. (Scripps Institution of Oceanography). 2018. ***Climate, Drought, and Sea Level Rise Scenarios for the Fourth California Climate Assessment.*** California's Fourth Climate Change Assessment, California Energy Commission. Publication number: CCCA4-CEC-2018-006.

Cayan, Daniel R., Tapash Das, David W. Pierce, Tim P. Barnett, Mary Tyree, and Alexander Gershunov. 2010. "Future Dryness in the Southwest US and the Hydrology of the Early 21st Century Drought." *Proceedings of the National Academy of Sciences of the United States of America* 107 (50): 21271–76.

Cayan, Daniel R., Edwin P. Maurer, Michael D. Dettinger, Mary Tyree, and Katharine Hayhoe. 2008. "Climate Change Scenarios for the California Region." *Climatic Change* 87 (S1): 21–42.

Cervero, Robert, and Kara Kockelman. 1997. "Travel Demand and the 3Ds: Density, Diversity, and Design." *Transportation Research Part D: Transport and Environment* 2 (3): 199–219.

Cervero, Robert, and Cathleen Sullivan. 2011. "Green TODs: Marrying Transit-Oriented Development and Green Urbanism." *International Journal of Sustainable Development and World Ecology* 18 (3): 210–18.

Cha, J. Mijin. "A Just Transition: Why Transitioning Workers into a New Clean Energy Economy Should Be at the Center of Climate Change Policies," 29 Fordham Envtl. L. Rev. 196 (2017)

Chandramowli, Shankar, and Frank A. Felder. 2013. "Impact of Climate Change on Electricity Systems and Markets - A Review of Models and Forecasts." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2251167.

Chang, Howard H., Jingwen Zhou, and Montserrat Fuentes. 2010. "Impact of Climate Change on Ambient Ozone Level and Mortality in Southeastern United States." *International Journal of Environmental Research and Public Health* 7 (7): 2866–80.

Chen, Cynthia, Hongmian Gong, and Robert Paaswell. 2007. "Role of the Built Environment on Mode Choice Decisions: Additional Evidence on the Impact of Density." *Transportation* 35 (3): 285–99.

Chester, Mikhail, Andrew Fraser, Juan Matute, Carolyn Flower, and Ram Pendyala. 2015. "Parking Infrastructure: A Constraint on or Opportunity for Urban Redevelopment? A Study of Los Angeles County Parking Supply and Growth." *Journal of the American Planning Association. American Planning Association* 81 (4): 268–86.

Chester, Mikhail, Stephanie Pincetl, Zoe Elizabeth, William Eisenstein, and Juan Matute. 2013. "Infrastructure and Automobile Shifts: Positioning Transit to Reduce Life-Cycle Environmental Impacts for Urban Sustainability Goals." *Environmental Research Letters: ERL [Web Site]* 8 (1): 015041.

Cho, Sungbin, James E. Moore II, Harry W. Richardson, and Costas Synolakis. 2005. "Could It Happen Here?" *Civil Engineering* . http://cwis.usc.edu/dept/tsunamis/2005/pdf/2005_03_28_socalTsunami2.pdf.

Chou, Chia, and J. David Neelin. 2004. "Mechanisms of Global Warming Impacts on Regional Tropical Precipitation*." *Journal of Climate* 17 (13): 2688–2701.

Christensen, N., and D. P. Lettenmaier. 2006. "A Multimodel Ensemble Approach to Assessment of Climate Change Impacts on the Hydrology and Water Resources of the Colorado River Basin." *Hydrology and Earth System Sciences Discussions* 3 (6): 3727–70.

Chung U, Gbegbelegbe S, Shiferaw B, Robertson R, Yunc JI, Tesfaye K, Hoogenboom G, Sonder K. 2014. Modeling the effect of a heat wave on maize production in the USA and its implications on food security in the developing world. Weather and Climate Extremes Volumes 5–6:67-77. Retrieved from https://www.sciencedirect.com/science/article/pii/S2212094714000668.

Ciscar, Juan-Carlos, and Paul Dowling. 2014. "Integrated Assessment of Climate Impacts and Adaptation in the Energy Sector." *Energy Economics* 46: 531–38.

Coffel, E., and R. Horton. 2014. "Climate Change and the Impact of Extreme Temperatures on Aviation." *Weather, Climate, and Society* 7 (1): 94–102.

Committee on Sea Level Rise in California, Oregon, and Washington, Board on Earth Sciences and Resources, Ocean Studies Board, Division on Earth and Life Studies, and National Research Council. 2012. *Sea-Level Rise for the Coasts of California, Oregon, and Washington:: Past, Present, and Future*. National Academies Press.

Conil, Sebastien, and Alex Hall. 2006. "Local Regimes of Atmospheric Variability: A Case Study of Southern California." *Journal of Climate* 19 (17): 4308–25.

Cook, Benjamin I., Toby R. Ault, and Jason E. Smerdon. 2015. "Unprecedented 21st Century Drought Risk in the American Southwest and Central Plains." *Science Advances* 1 (1): e1400082.

Corburn J. 2005. Street Science: Community Knowledge and Environmental Health Justice. MIT Press.

Corburn J. 2009. Cities, Climate Change and Urban Heat Island Mitigation: Localising Global Environmental Science. Urban Studies 46 (2): 413–27.

Coseo, Paul, and Larissa Larsen. 2014. "How Factors of Land Use/land Cover, Building Configuration, and Adjacent Heat Sources and Sinks Explain Urban Heat Islands in Chicago." *Landscape and Urban Planning* 125: 117–29.

Costa-Cabral, Mariza, Sujoy B. Roy, Edwin P. Maurer, William B. Mills, and Limin Chen. 2012. "Snowpack and Runoff Response to Climate Change in Owens Valley and Mono Lake Watersheds." *Climatic Change* 116 (1): 97–109.

Costello, Anthony, Mustafa Abbas, Adriana Allen, Sarah Ball, Sarah Bell, Richard Bellamy, Sharon Friel, et al. 2009. "Managing the Health Effects of Climate Change: Lancet and University College London Institute for Global Health Commission." *The Lancet* 373 (9676): 1693–1733.

Cushing L, Wander M, Morello-Frosch R, Pastor M, Zhu A, Sadd J. 2016. A Preliminary Environmental Equity Assessment Of California's Cap-and-Trade Program.

Daugovish, Oleg, Anna Howell, Steven Fennimore, Steven Koike, Thomas Gordon, and Krishna Subbarao. 2016. "Non-Fumigant Treatments and Their Combinations Affect Soil Pathogens and Strawberry Performance in Southern California." *International Journal of Fruit Science* 16 (sup1): 37–46.

DeConto, Robert M., and David Pollard. 2016. "Contribution of Antarctica to Past and Future Sea-Level Rise." *Nature* 531 (7596): 591–97.

Delfino, R. J., S. Brummel, J. Wu, H. Stern, B. Ostro, M. Lipsett, A. Winer, et al. 2009. "The Relationship of Respiratory and Cardiovascular Hospital Admissions to the Southern California Wildfires of 2003." *Occupational and Environmental Medicine* 66 (3): 189–97.

Dennison, Philip E., Simon C. Brewer, James D. Arnold, and Max A. Moritz. 2014. "Large Wildfire Trends in the Western United States, 1984-2011." *Geophysical Research Letters* 41 (8): 2928–33.

Dettinger, Michael. 2011a. "Climate Change, Atmospheric Rivers, and Floods in California - A Multimodel Analysis of Storm Frequency and Magnitude Changes1." *JAWRA Journal of the American Water Resources Association* 47 (3): 514–23.

———. 2011b. "Climate Change, Atmospheric Rivers, and Floods in California - A Multimodel Analysis of Storm Frequency and Magnitude Changes1." *JAWRA Journal of the American Water Resources Association* 47 (3): 514–23.

Dettinger, Michael D. 2013. "Atmospheric Rivers as Drought Busters on the U.S. West Coast." *Journal of Hydrometeorology* 14 (6): 1721–32.

Dettinger, Michael D., Fred Martin Ralph, Tapash Das, Paul J. Neiman, and Daniel R. Cayan. 2011. "Atmospheric Rivers, Floods and the Water Resources of California." *WATER* 3 (4): 445–78.

Dettinger, Michael, Bradley Udall, and Aris Georgakakos. 2015. "Western Water and Climate Change." *Ecological Applications: A Publication of the Ecological Society of America* 25 (8): 2069–93.

Diffenbaugh, Noah S., Daniel L. Swain, and Danielle Touma. 2015. "Anthropogenic Warming Has Increased Drought Risk in California." *Proceedings of the National Academy of Sciences of the United States of America* 112 (13): 3931–36.

Doughty, C., Cavanaugh, K., Ambrose, R. and Stein, E., 2016. Assessment of Sea Level Rise Vulnerability for Southern California Coastal Estuaries.

———. Sea Level Rise Impacts to Coastal Habitats in Southern California Estuaries. University of Southern California Sea Grant Traineeship Program Report, 35 p.

Dracup, J. A., and S. Vicuna. 2005. "An Overview of Hydrology and Water Resources Studies on Climate Change: The California Experience." In *Impacts of Global Climate Change*. https://doi.org/10.1061/40792(173)483.

Drehobl A, Ross L. 2016. Lifting the high energy burden in America's largest cities: How energy efficiency can improve low-income and underserved communities. American Council for Energy Efficiency. Retrieved from http://aceee.org/research-report/u1602

Dwight, Ryan H., and Jan C. Semenza. 2006. "Comment on 'Coastal Water Quality Impact of Stormwater Runoff from an Urban Watershed in Southern California.'" *Environmental Science & Technology* 40 (10): 3440–3440.

Dwight, Ryan H., Jan C. Semenza, Dean B. Baker, and Betty H. Olson. 2002. "Association of Urban Runoff with Coastal Water Quality in Orange County, California." *Water Environment Research: A Research Publication of the Water Environment Federation* 74 (1): 82–90.

Ebi, Kristie L., and Glenn McGregor. 2008. "Climate Change, Tropospheric Ozone and Particulate Matter, and Health Impacts." *Environmental Health Perspectives* 116 (11): 1449–55.

Edwards, M., D. G. Johns, S. C. Leterme, E. Svendsen, and A. J. Richardson. 2006. "Regional Climate Change and Harmful Algal Blooms in the Northeast Atlantic." *Limnology and Oceanography* 51 (2): 820–29.

Ekstrom, Julia A., Lisa Suatoni, Sarah R. Cooley, Linwood H. Pendleton, George G. Waldbusser, Josh E. Cinner, Jessica Ritter, et al. 2015. "Vulnerability and Adaptation of US Shellfisheries to Ocean Acidification." *Nature Climate Change* 5 (3): 207–14.

Elias, Emile, Alison Marklein, John T. Abatzoglou, Jake Dialesandro, Joel Brown, Caiti Steele, Albert Rango, and Kerri Steenwerth. 2017. "Vulnerability of Field Crops to Midcentury Temperature Changes and Yield Effects in the Southwestern USA." *Climatic Change*. https://doi.org/10.1007/s10584-017-2108-8.

English P., K. Fitzsimmons, S. Hoshiko, T. Kim, H. G. Margolis, T. E., McKone, M. Rotkin-Ellman, G. Solomon, R. Trent & Z. Ross. 2007. *Public health impacts of climate change in California: Community vulnerability assessments and adaptation strategies.* Richmond, California: Climate Change Public Health Impacts Assessment and Response Collaborative, California Department of Public Health and Public Health Institute. Retrieved from http://www.energy.ca.gov/2008publications/DPH-1000-2008-014/DPH-1000-2008-014.PDF (accessed July 9, 2018)

English PB and Richardson MJ. 2016. Components of Population Vulnerability and Their Relationship With Climate-Sensitive Health. Current Environmental Health Report. March 2016. Vol. 3, Issue 1. pg. 91-98.

English, P, M. Richardson, R. Morello-Frosh, M. Pastor, J. Sadd, G. King, W. Jesdale, and M. Jerrett, 2013, Racial and Income Disparities in Relation to a Proposed Climate Change Vulnerability Screening Method for California, International Journal of Climate Change: Impacts and Responses, 4(2), 1-18.

Epstein, Scott A., Sang-Mi Lee, Aaron S. Katzenstein, Marc Carreras-Sospedra, Xinqiu Zhang, Salvatore C. Farina, Pouya Vahmani, Philip M. Fine, and George Ban-Weiss. 2017. "Air-Quality Implications of Widespread Adoption of Cool Roofs on Ozone and Particulate Matter in Southern California." *Proceedings of the National Academy of Sciences of the United States of America* 114 (34): 8991–96.

Erie, Steven P., and Harold David Brackman. 2006. *Beyond Chinatown: The Metropolitan Water District, Growth, and the Environment in Southern California*. Stanford University Press.

Erikson, Li, Patrick Barnard, Andrea O'Neill, Nathan Wood, Jeanne Jones, Juliette Finzi Hart, Sean Vitousek, et al. 2018. "Projected 21st Century Coastal Flooding in the Southern California Bight. Part 2: Tools for Assessing Climate Change-Driven Coastal Hazards and Socio-Economic Impacts." *Journal of Marine Science and Engineering* 6 (3): 76.

Faber, Ben (2015). "Irrigating citrus with limited water." UC ANR Publication 8549. Oakland, CA. http://anrcatalog.ucanr.edu/pdf/8549.pdf.

Faber, BA, Willen CA, Eskalen A, Morse JG, Hanson B, and Hoddle MS. 2016. "Persea mite." In UC IPM Pest Management Guidelines: Avocado. UC ANR Publication 3436. http://ipm.ucanr.edu/PMG/r8400211.html

Fairley, Peter. 2016. "The Troubled Link between Gas and Electricity Grids [News]." *IEEE Spectrum* 53 (6): 11–12.

Faivre, N. R., Y. Jin, M. L. Goulden, and J. T. Randerson. 2016. "Spatial Patterns and Controls on Burned Area for Two Contrasting Fire Regimes in Southern California." *Ecosphere* 7 (5): e01210.

Federal Transit Administration. 2016. "Default Useful Life Benchmark (ULB) Cheat Sheet." October 26, 2016. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA%20TAM%20ULB%20Cheat%20Sheet%202016-10-26.pdf.

Finlay, Sarah Elise, Andrew Moffat, Rob Gazzard, David Baker, and Virginia Murray. 2012. "Health Impacts of Wildfires." *PLoS Currents*. https://doi.org/10.1371/4f959951cce2c.

Fraser, Andrew M., and Mikhail V. Chester. 2017a. "Transit System Design and Vulnerability of Riders to Heat." *Journal of Transport & Health* 4: 216–25.

———. 2017b. "Transit System Design and Vulnerability of Riders to Heat." *Journal of Transport & Health* 4 (March): 216–25.

———. 2017c. "Transit Planning and Climate Change: Reducing Rider's Vulnerability to Heat." In *International Conference on Sustainable Infrastructure 2017*, 456–64. Reston, VA: American Society of Civil Engineers.

Fraser, Andrew M., Mikhail V. Chester, David Eisenman, David M. Hondula, Stephanie S. Pincetl, Paul English, and Emily Bondank. 2016. "Household Accessibility to Heat Refuges: Residential Air Conditioning, Public Cooled Space, and Walkability." *Environment and Planning B: Urban Analytics and City Science* 44 (6): 1036–55.

Gallivan, Frank, Jeff Ang-Olson, Cris Liban, and Alvin Kusumoto. 2011. "Cost-Effective Approaches to Reduce Greenhouse Gas Emissions Through Public Transportation in Los Angeles, California." *Transportation Research Record: Journal of the Transportation Research Board* 2217 (December): 19–29.

Ganin, Alexander A., Maksim Kitsak, Dayton Marchese, Jeffrey M. Keisler, Thomas Seager, and Igor Linkov. 2017. "Resilience and Efficiency in Transportation Networks." *Science Advances* 3 (12): e1701079.

Gao, Yang, Jian Lu, L. Ruby Leung, Qing Yang, Samson Hagos, and Yun Qian. 2015. "Dynamical and Thermodynamical Modulations on Future Changes of Landfalling Atmospheric Rivers over Western North America." *Geophysical Research Letters* 42 (17): 7179–86.

Gilbert, Haley E., Pablo J. Rosado, George Ban-Weiss, John T. Harvey, Hui Li, Benjamin H. Mandel, Dev Millstein, Arash Mohegh, Arash Saboori, and Ronnen M. Levinson. 2017. "Energy and Environmental Consequences of a Cool Pavement Campaign." *Energy and Buildings* 157: 53–77.

Gillespie, Thomas W., Stacey Ostermann-Kelm, Chunyu Dong, Katherine S. Willis, Gregory S. Okin, and Glen M. MacDonald. 2018. "Monitoring Changes of NDVI in Protected Areas of Southern California." *Ecological Indicators* 88: 485–94.

Glaeser, Edward L., and Matthew E. Kahn. 2010. "The Greenness of Cities: Carbon Dioxide Emissions and Urban Development." *Journal of Urban Economics* 67 (3): 404–18.

Glibert, Patricia, Sybil Seitzinger, Cynthia Heil, Joann Burkholder, Matthew Parrow, Louis Codispoti, and Vince Kelly. 2005. "The Role of Eutrophication in the Global Proliferation of Harmful Algal Blooms." *Oceanography* 18 (2): 198–209.

Gomez-Ibanez, Dr Jose, Marlon G. Boarnet, Dianne R. Brake, Robert B. Cervero, Andrew Cotugno, Anthony Downs, Susan Hanson, et al. 2009. "Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions," January. https://www.osti.gov/scitech/biblio/980706.

Gordo, Oscar, and Juan José Sanz. 2010. "Impact of Climate Change on Plant Phenology in Mediterranean Ecosystems." *Global Change Biology* 16 (3): 1082–1106.

Griffin, Daniel, and Kevin J. Anchukaitis. 2014. "How Unusual Is the 2012-2014 California Drought?" *Geophysical Research Letters* 41 (24): 9017–23.

Grifman, P. M., J. F. Hart, J. Ladwig, A. G. Newton Mann, M. Schulhof. (2013) Sea Level Rise Vulnerability Study for the City of Los Angeles. USCSG-TR-05-2013.

Griggs, G, Árvai, J, Cayan, D, DeConto,. R, Fox, J, Fricker, HA, Kopp, RE,. Tebaldi, C, Whiteman, EA (California. Ocean Protection Council Science. Advisory Team Working Group). Rising Seas in California: An Update on Sea-Level Rise Science. California. Ocean Science Trust, April 2017.

Groves, David G., David Yates, and Claudia Tebaldi. 2008. "Developing and Applying Uncertain Global Climate Change Projections for Regional Water Management Planning." *Water Resources Research* 44 (12). https://doi.org/10.1029/2008wr006964.

Guan, Bin, Noah P. Molotch, Duane E. Waliser, Eric J. Fetzer, and Paul J. Neiman. 2013. "The 2010/2011 Snow Season in California's Sierra Nevada: Role of Atmospheric Rivers and Modes of Large-Scale Variability." *Water Resources Research* 49 (10): 6731–43.

Gubler, D. J., P. Reiter, K. L. Ebi, W. Yap, R. Nasci, and J. A. Patz. 2001. "Climate Variability and Change in the United States: Potential Impacts on Vector- and Rodent-Borne Diseases." *Environmental Health Perspectives* 109 Suppl 2 (May): 223–33.

Guzman-Morales, Janin, Alexander Gershunov, Jurgen Theiss, Haiqin Li, and Daniel Cayan. 2016a. "Santa Ana Winds of Southern California: Their Climatology, Extremes, and Behavior Spanning Six and a Half Decades." *Geophysical Research Letters* 43 (6): 2827–34.

———. 2016b. "Santa Ana Winds of Southern California: Their Climatology, Extremes, and Behavior Spanning Six and a Half Decades." *Geophysical Research Letters* 43 (6): 2827–34.

Hagos, Samson M., L. Ruby Leung, Jin-Ho Yoon, Jian Lu, and Yang Gao. 2016. "A Projection of Changes in Landfalling Atmospheric River Frequency and Extreme Precipitation over Western North America from the Large Ensemble CESM Simulations." *Geophysical Research Letters* 43 (3): 1357–63.

Hahn, Micah B., Andrew J. Monaghan, Mary H. Hayden, Rebecca J. Eisen, Mark J. Delorey, Nicole P. Lindsey, Roger S. Nasci, and Marc Fischer. 2015. "Meteorological Conditions Associated with Increased Incidence of West Nile Virus Disease in the United States, 2004-2012." *The American Journal of Tropical Medicine and Hygiene* 92 (5): 1013–22.

Hamin, Elisabeth M., and Nicole Gurran. 2009. "Urban Form and Climate Change: Balancing Adaptation and Mitigation in the U.S. and Australia." *Habitat International* 33 (3): 238–45.

Hamlet, Alan F., and Dennis P. Lettenmaier. 1999. "EFFECTS OF CLIMATE CHANGE ON HYDROLOGY AND WATER RESOURCES IN THE COLUMBIA RIVER BASIN." *Journal of the American Water Resources Association* 35 (6): 1597–1623.

Hanak, Ellen, and Matthew Davis. 2006. *Lawns and Water Demand in California*.

Hanak, Ellen, and Georgina Moreno. 2012. "California Coastal Management with a Changing Climate." *Climatic Change* 111 (1): 45–73.

Hanigan, Ivan C., Colin D. Butler, Philip N. Kokic, and Michael F. Hutchinson. 2012. "Suicide and Drought in New South Wales, Australia, 1970–2007." *Proceedings of the National Academy of Sciences of the United States of America* 109 (35): 13950–55.

Harlan, Sharon L., Juan H. Declet-Barreto, William L. Stefanov, and Diana B. Petitti. 2013. "Neighborhood Effects on Heat Deaths: Social and Environmental Predictors of Vulnerability in Maricopa County, Arizona." *Environmental Health Perspectives* 121 (2): 197–204.

Harrigan RJ, Thomassen HA, Buermann W, Smith TB. 2014. A continental risk assessment of West Nile virus under climate change. Global Change Biology 20(8):2417-2425.

Harris, Sarah M., and Leila M. V. Carvalho. 2017. "Characteristics of Southern California Atmospheric Rivers." *Theoretical and Applied Climatology*. https://doi.org/10.1007/s00704-017-2138-1.

Hart, Juliette Finzi, Susanne Moser. (U.S. Geological Survey and Susanne Moser Research & Consulting). 2018. ***The Adaptation Blind Spot-Electrical Grid Teleconnected and Cascading Climate Change Impacts on Community Lifelines in Los Angeles***. California's Fourth Climate Change Assessment, California Energy Commission. Publication number: CCCA4-CEC-2018-008.

Hayhoe, Katharine, Daniel Cayan, Christopher B. Field, Peter C. Frumhoff, Edwin P. Maurer, Norman L. Miller, Susanne C. Moser, et al. 2004. "Emissions Pathways, Climate Change, and Impacts on California." *Proceedings of the National Academy of Sciences of the United States of America* 101 (34): 12422–27.

Heberger, M., Cooley, H., Herrera, P., Gleick, P.H., Moore, E., 2009. The impacts of sea level rise on the California coast. California Climate Change Center, Sacramento.

Held, Isaac M., and Brian J. Soden. 2006. "Robust Responses of the Hydrological Cycle to Global Warming." *Journal of Climate* 19 (21): 5686–99.

He, Minxue, and Mahesh Gautam. 2016. "Variability and Trends in Precipitation, Temperature and Drought Indices in the State of California." *Hydrology* 3 (4): 14.

Hoegh-Guldberg, O., and J. F. Bruno. 2010. "The Impact of Climate Change on the World's Marine Ecosystems." *Science* 328 (5985): 1523–28.

Hoell, Andrew, Martin Hoerling, Jon Eischeid, Klaus Wolter, Randall Dole, Judith Perlwitz, Taiyi Xu, and Linyin Cheng. 2016. "Does El Niño Intensity Matter for California Precipitation?" *Geophysical Research Letters* 43 (2): 819–25.

Hoover, Daniel J., Kingsley O. Odigie, Peter W. Swarzenski, and Patrick Barnard. 2017. "Sea-Level Rise and Coastal Groundwater Inundation and Shoaling at Select Sites in California, USA." *Journal of Hydrology: Regional Studies* 11: 234–49.

Horton, Daniel E., Nathaniel C. Johnson, Deepti Singh, Daniel L. Swain, Bala Rajaratnam, and Noah S. Diffenbaugh. 2015. "Contribution of Changes in Atmospheric Circulation Patterns to Extreme Temperature Trends." *Nature* 522 (7557): 465–69.

Houston, Douglas, Marlon G. Boarnet, Gavin Ferguson, and Steven Spears. 2014. "Can Compact Rail Transit Corridors Transform the Automobile City? Planning for More Sustainable Travel in Los Angeles." *Urban Studies* 52 (5): 938–59.

Hughes, Mimi, and Alex Hall. 2009a. "Local and Synoptic Mechanisms Causing Southern California's Santa Ana Winds." *Climate Dynamics* 34 (6): 847–57.

———. 2009b. "Local and Synoptic Mechanisms Causing Southern California's Santa Ana Winds." *Climate Dynamics* 34 (6): 847–57.

Hughes, Mimi, Alex Hall, and Jinwon Kim. 2011a. "Human-Induced Changes in Wind, Temperature and Relative Humidity during Santa Ana Events." *Climatic Change* 109 (S1): 119–32.

———. 2011b. "Human-Induced Changes in Wind, Temperature and Relative Humidity during Santa Ana Events." *Climatic Change* 109 (S1): 119–32.

Hundley, Norris. 2001. *The Great Thirst: Californians and Water—A History, Revised Edition*. Univ of California Press.

Iacobellis, Sam F., and Daniel R. Cayan. 2013. "The Variability of California Summertime Marine Stratus: Impacts on Surface Air Temperatures." *Journal of Geophysical Research, D: Atmospheres* 118 (16): 9105–22.

Imhoff, Marc L., Ping Zhang, Robert E. Wolfe, and Lahouari Bounoua. 2010. "Remote Sensing of the Urban Heat Island Effect across Biomes in the Continental USA." *Remote Sensing of Environment* 114 (3): 504–13.

Jacob, Daniel J., and Darrell A. Winner. 2009. "Effect of Climate Change on Air Quality." *Atmospheric Environment* 43 (1): 51–63.

Jacobson, Mark Z. 2008. "On the Causal Link between Carbon Dioxide and Air Pollution Mortality." *Geophysical Research Letters* 35 (3). https://doi.org/10.1029/2007gl031101.

Janowiak, Maria K.; Daniel N. Dostie; Michael A. Wilson; Michael J. Kucera; R. Howard Skinner; Jerry L. Hatfield; David Hollinger; and Christopher W. Swanston. 2016. "Adaptation Resources for Agriculture: Responding to Climate Variability and Change in the Midwest and Northeast." Technical Bulletin 1944. U.S. Department of Agriculture, Washington, DC. October 2016. 72 pp.

Jenerette, G. Darrel, G. Darrel Jenerette, Sharon L. Harlan, Alexander Buyantuev, William L. Stefanov, Juan Declet-Barreto, Benjamin L. Ruddell, Soe Win Myint, Shai Kaplan, and Xiaoxiao Li. 2015. "Micro-Scale Urban Surface Temperatures Are Related to Land-Cover Features and Residential Heat Related Health Impacts in Phoenix, AZ USA." *Landscape Ecology* 31 (4): 745–60.

Jesdale B, Morello-Frosch R, and Cushing L. 2013. The Racial/Ethnic Distribution of Heat Risk-Related Land Cover in Relation to Residential Segregation. Environmental Health Perspectives. 121:811–817. https://ehp.niehs.nih.gov/1205919/ (accessed March 7, 2018).

Jin, Yufang, Michael L. Goulden, Nicolas Faivre, Sander Veraverbeke, Fengpeng Sun, Alex Hall, Michael S. Hand, Simon Hook, and James T. Randerson. 2015. "Identification of Two Distinct Fire Regimes in Southern California: Implications for Economic Impact and Future Change." *Environmental Research Letters: ERL [Web Site]* 10 (9): 094005.

Jin, Yufang, James T. Randerson, Nicolas Faivre, Scott Capps, Alex Hall, and Michael L. Goulden. 2014. "Contrasting Controls on Wildland Fires in Southern California during Periods with and without Santa Ana Winds." *Journal of Geophysical Research: Biogeosciences* 119 (3): 432–50.

Jongsomjit, Dennis, Diana Stralberg, Thomas Gardali, Leonardo Salas, and John Wiens. 2012. "Between a Rock and a Hard Place: The Impacts of Climate Change and Housing Development on Breeding Birds in California." *Landscape Ecology* 28 (2): 187–200.

Joyce, Brian A., Vishal K. Mehta, David R. Purkey, Larry L. Dale, and Michael Hanemann. 2011. "Modifying Agricultural Water Management to Adapt to Climate Change in California's Central Valley." *Climatic Change* 109 (S1): 299–316.

Kalkstein, Adam J., Laurence S. Kalkstein, Jennifer K. Vanos, David P. Eisenman, and P. Grady Dixon. 2018. "Heat/mortality Sensitivities in Los Angeles during Winter: A Unique Phenomenon in the United States." *Environmental Health: A Global Access Science Source* 17. https://doi.org/10.1186/s12940-018-0389-7.

Kar, Nilamadhab, and Binaya Kumar Bastia. 2006. "Post-Traumatic Stress Disorder, Depression and Generalised Anxiety Disorder in Adolescents after a Natural Disaster: A Study of Comorbidity." *Clinical Practice and Epidemiology in Mental Health: CP & EMH* 2 (July): 17.

Keeley, Jon E. 2000. Fire and invasive species in Mediterranean-climate ecosystems of California. In *Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species*. Fire Conference (pp. 81-94).

Keeley, Jon E., C. J. Fotheringham, and Melanie Baer-Keeley. 2005. "DETERMINANTS OF POSTFIRE RECOVERY AND SUCCESSION IN MEDITERRANEAN-CLIMATE SHRUBLANDS OF CALIFORNIA." *Ecological Applications: A Publication of the Ecological Society of America* 15 (5): 1515–34.

Keeley, Jon, and Alexandra Syphard. 2016. "Climate Change and Future Fire Regimes: Examples from California." *Geosciences Journal* 6 (4): 37.

Kenny, Glen P., Jane Yardley, Candice Brown, Ronald J. Sigal, and Ollie Jay. 2010. "Heat Stress in Older Individuals and Patients with Common Chronic Diseases." *CMAJ: Canadian Medical Association Journal = Journal de l'Association Medicale Canadienne* 182 (10): 1053–60.

Kenward A, Adams-Smith D, Raja U. 2013. Wildfires and air pollution: The hidden health hazards of climate change. Climate Central. Retrieved from http://assets.climatecentral.org/pdfs/WildfiresAndAirPollution.pdf

Kerr, Amber, Jake Dialesandro, Kerri Steenwerth, Nathan Lopez-Brody, and Emile Elias. 2017. "Vulnerability of California Specialty Crops to Projected Mid-Century Temperature Changes." *Climatic Change*. https://doi.org/10.1007/s10584-017-2011-3.

Kim, Dohyung, Jooil Lee, and Simon Choi. 2015. "Balancing Mobility and CO2 Reduction by a Mode Share Scheme: A Comparison of Los Angeles and Seoul Metropolitan Areas." *International Journal of Urban Sciences* 19 (2): 168–81.

Kim, Jinwon, Duane E. Waliser, Paul J. Neiman, Bin Guan, Ju-Mee Ryoo, and Gary A. Wick. 2012. "Effects of Atmospheric River Landfalls on the Cold Season Precipitation in California." *Climate Dynamics* 40 (1-2): 465–74.

King et al., 2011. The economic costs of sea-level rise to California beach communities. California Department of Boating and Waterways, 2010, 82 pp.

Klausmeyer, Kirk R., and M. Rebecca Shaw. 2009. "Climate Change, Habitat Loss, Protected Areas and the Climate Adaptation Potential of Species in Mediterranean Ecosystems Worldwide." *PloS One* 4 (7): e6392.

Kleeman, Michael J., Christina Zapata, John Stilley, and Mark Hixson. 2012. "PM2.5 Co-Benefits of Climate Change Legislation Part 2: California Governor's Executive Order S-3-05 Applied to the Transportation Sector." *Climatic Change* 117 (1-2): 399–414.

Klein, Stephen A., Alex Hall, Joel R. Norris, and Robert Pincus. 2017. "Low-Cloud Feedbacks from Cloud-Controlling Factors: A Review." *Surveys in Geophysics* 38 (6): 1307–29.

Knowlton, Kim, Miriam Rotkin-Ellman, Galatea King, Helene G. Margolis, Daniel Smith, Gina Solomon, Roger Trent, and Paul English. 2009. "The 2006 California Heat Wave: Impacts on Hospitalizations and Emergency Department Visits." *Environmental Health Perspectives* 117 (1): 61–67.

Kopp, Robert E., Radley M. Horton, Christopher M. Little, Jerry X. Mitrovica, Michael Oppenheimer, D. J. Rasmussen, Benjamin H. Strauss, and Claudia Tebaldi. 2014. "Probabilistic 21st and 22nd Century Sea-Level Projections at a Global Network of Tide-Gauge Sites." *Earth's Future* 2 (8): 383–406.

Krug, Etienne G., Marcie-Jo Kresnow, John P. Peddicord, Linda L. Dahlberg, Kenneth E. Powell, Alex E. Crosby, and Joseph L. Annest. 1999. "Retraction: Suicide after Natural Disasters." *The New England Journal of Medicine* 340 (2): 148–49.

Kueppers, Lara M., Mark A. Snyder, Lisa C. Sloan, Erika S. Zavaleta, and Brian Fulfrost. 2005. "Modeled Regional Climate Change and California Endemic Oak Ranges." *Proceedings of the National Academy of Sciences of the United States of America* 102 (45): 16281–86.

Kuhns, H., V. Etyemezian, M. Green, Karin Hendrickson, Michael McGown, Kevin Barton, and Marc Pitchford. 2003. "Vehicle-Based Road Dust Emission measurement—Part II: Effect of Precipitation, Wintertime Road Sanding, and Street Sweepers on Inferred PM10 Emission Potentials from Paved and Unpaved Roads." *Atmospheric Environment* 37 (32): 4573–82.

LA Parks, 2018. Venice Beach. Accessed June 25, 2018 at https://www.laparks.org/venice.

Lee, Haejin, Sim-Lin Lau, Masoud Kayhanian, and Michael K. Stenstrom. 2004. "Seasonal First Flush Phenomenon of Urban Stormwater Discharges." *Water Research* 38 (19): 4153–63.

Levinson RM, Gilbert HE, Jin L, Mandel BH, Millstein D, Rosado PJ, Harvey JT, Kendall A, Li H, Saboori A, Lea J, Ban-Weiss G, Mohegh A, Santero N. 2017. Life Cycle Assessment and Co-Benefits of Cool Pavements. Final report for Contract #12-314, California Air Resources Board, Sacramento, CA. https://www.arb.ca.gov/research/apr/past/12-314.pdf

Levinson, Ronnen, and Hashem Akbari. 2009. "Potential Benefits of Cool Roofs on Commercial Buildings: Conserving Energy, Saving Money, and Reducing Emission of Greenhouse Gases and Air Pollutants." *Energy Efficiency* 3 (1): 53–109.

Limber, Patrick W., Patrick L. Barnard, Sean Vitousek, and Li H. Erikson. 2018. "A Model Ensemble for Projecting Multi-Decadal Coastal Cliff Retreat during the 21st Century." *Journal of Geophysical Research: Earth Surface*. https://doi.org/10.1029/2017jf004401.

Litvak, Elizaveta, Neeta S. Bijoor, and Diane E. Pataki. 2013. "Adding Trees to Irrigated Turfgrass Lawns May Be a Water-Saving Measure in Semi-Arid Environments." *Ecohydrology*. https://doi.org/10.1002/eco.1458.

Litvak, E., K. F. Manago, T. S. Hogue, and D. E. Pataki. 2017a. "Evapotranspiration of Urban Landscapes in Los Angeles, California at the Municipal Scale." *Water Resources Research* 53 (5): 4236–52.

———. 2017b. "Evapotranspiration of Urban Landscapes in Los Angeles, California at the Municipal Scale." *Water Resources Research* 53 (5): 4236–52.

Livingston M, Branson-Potts H, Etehad M, Serna J. 2018, January 10. Deadly flooding on Santa Barbara coast as fire turns to mud. *Los Angeles Times.* Retrieved from http://www.latimes.com/local/lanow/la-me-mudslide-santa-barbara-20180110-story.html.

Loarie, Scott R., Benjamin E. Carter, Katharine Hayhoe, Sean McMahon, Richard Moe, Charles A. Knight, and David D. Ackerly. 2008. "Climate Change and the Future of California's Endemic Flora." *PloS One* 3 (6): e2502.

Lobell, David B., Kimberly Nicholas Cahill, and Christopher B. Field. 2007. "Historical Effects of Temperature and Precipitation on California Crop Yields." *Climatic Change* 81 (2): 187–203.

Lobell, David B., and Christopher B. Field. 2011. "California Perennial Crops in a Changing Climate." *Climatic Change* 109 (S1): 317–33.

Los Angeles (LA) County Department of Beaches and Harbors, 2016. Final Report Los Angeles County Public Beach Facilities Sea-Level Rise Vulnerability Assessment.

Los Angeles County Department of Public Health. 2017. West Nile Virus in Los Angeles County. Retrieved from http://publichealth.lacounty.gov/acd/WNVData.htm

Los Angeles Regional Collaborative for Environmental Health and Justice. Hidden Hazards: A Call to Action for Healthy, Livable Communities. December 2010. https://www.libertyhill.org/sites/libertyhillfoundation/files/hidden-hazards-low-res-version.pdf (accessed March 7, 2018)

Lund, Hollie. 2006. "Reasons for Living in a Transit-Oriented Development, and Associated Transit Use." *Journal of the American Planning Association. American Planning Association* 72 (3): 357–66.

Lyon, Greg S., and Eric D. Stein. 2009. "How Effective Has the Clean Water Act Been at Reducing Pollutant Mass Emissions to the Southern California Bight over the Past 35 Years?" *Environmental Monitoring and Assessment* 154 (1-4): 413–26.

MacDonald, Glen M. 2007. "Severe and Sustained Drought in Southern California and the West: Present Conditions and Insights from the Past on Causes and Impacts." *Quaternary International: The Journal of the International Union for Quaternary Research* 173-174: 87–100.

———. 2010. "Climate Change and Water in Southwestern North America Special Feature: Water, Climate Change, and Sustainability in the Southwest." *Proceedings of the National Academy of Sciences of the United States of America* 107 (50): 21256–62.

Madani, Kaveh, and Jay R. Lund. 2010. "The Sacramento-San Joaquin Delta Conflict: Chicken or Prisoner's Dilemma?" In *World Environmental and Water Resources Congress 2010*. https://doi.org/10.1061/41114(371)259.

Mahmud, Abdullah, Mary Tyree, Dan Cayan, Nehzat Motallebi, and Michael J. Kleeman. 2008. "Statistical Downscaling of Climate Change Impacts on Ozone Concentrations in California." *Journal of Geophysical Research* 113 (D21). https://doi.org/10.1029/2007jd009534.

Mahmud, A., M. Hixson, J. Hu, Z. Zhao, S. Chen, and M. J. Kleeman. 2010. "Climate Impact on Airborne Particulate Matter Concentrations in California Using Seven Year Analysis Periods." *Atmospheric Chemistry and Physics Discussions* 10 (2): 2985–3020.

Maibach, Edward W., Jennifer M. Kreslake, Connie Roser-Renouf, Seth Rosenthal, Geoff Feinberg, and Anthony A. Leiserowitz. 2015. "Do Americans Understand That Global Warming Is Harmful to Human Health? Evidence From a National Survey." *Annals of Global Health* 81 (3): 396–409.

Manago, Kimberly F., and Terri S. Hogue. 2017. "Urban Streamflow Response to Imported Water and Water Conservation Policies in Los Angeles, California." *JAWRA Journal of the American Water Resources Association* 53 (3): 626–40.

Margulis, Steven A., Gonzalo Cortés, Manuela Girotto, Laurie S. Huning, Dongyue Li, and Michael Durand. 2016. "Characterizing the Extreme 2015 Snowpack Deficit in the Sierra Nevada (USA) and the Implications for Drought Recovery." *Geophysical Research Letters* 43 (12): 6341–49.

Marshall, Grant N., Terry L. Schell, Marc N. Elliott, Nadine R. Rayburn, and Lisa H. Jaycox. 2007. "Psychiatric Disorders among Adults Seeking Emergency Disaster Assistance after a Wildland-Urban Interface Fire." *Psychiatric Services* 58 (4): 509–14.

Maurer, Edwin P. 2007. "Uncertainty in Hydrologic Impacts of Climate Change in the Sierra Nevada, California, under Two Emissions Scenarios." *Climatic Change* 82 (3-4): 309–25.

Mazur L, Milanes C, Randles K, Siegel D. 2010. Indicators of climate change in California: Environmental justice impacts. California Office of Environmental Health Hazard Assessment. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.432.2142&rep=rep1&type=pdf

McClatchie, S., R. Goericke, R. Cosgrove, G. Auad, and R. Vetter. 2010. "Oxygen in the Southern California Bight: Multidecadal Trends and Implications for Demersal Fisheries." *Geophysical Research Letters* 37 (19). https://doi.org/10.1029/2010gl044497.

McDermott, Brett M., Erica M. Lee, Marianne Judd, and Peter Gibbon. 2005. "Posttraumatic Stress Disorder and General Psychopathology in Children and Adolescents Following a Wildfire Disaster." *The Canadian Journal of Psychiatry* 50 (3): 137–43.

Meyer, Michael, Adjo Amekudzi, and John O'Har. 2010. "Transportation Asset Management Systems and Climate Change: Adaptive Systems Management Approach." *Transportation Research Record: Journal of the Transportation Research Board*, no. 2160: 12–20.

Miller, Norman L., Kathy E. Bashford, and Eric Strem. 2003. "POTENTIAL IMPACTS OF CLIMATE CHANGE ON CALIFORNIA HYDROLOGY." *Journal of the American Water Resources Association* 39 (4): 771–84.

Miller, Norman L., and Nicole J. Schlegel. 2006. "Climate Change Projected Fire Weather Sensitivity: California Santa Ana Wind Occurrence." *Geophysical Research Letters* 33 (15). https://doi.org/10.1029/2006gl025808.

Miller, Stephen R. 2013. "Sustainable Cities of Tomorrow: A Land Use Response to Climate Change," July. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2346405.

Mini, C., T. S. Hogue, and S. Pincetl. 2014a. "Estimation of Residential Outdoor Water Use in Los Angeles, California." *Landscape and Urban Planning* 127: 124–35.

———. 2014b. "Estimation of Residential Outdoor Water Use in Los Angeles, California." *Landscape and Urban Planning* 127: 124–35.

———. 2014c. "Patterns and Controlling Factors of Residential Water Use in Los Angeles, California." *Water Policy* 16 (6): 1054–69.

Minkler, M., & Wallerstein, N. (2003). *Community based participatory research for health*. San Francisco, CA : Jossey-Bass. Retrieved from https://trove.nla.gov.au/version/46586587

Mitchell, Todd P., and Warren Blier. 1997. "The Variability of Wintertime Precipitation in the Region of California." *Journal of Climate* 10 (9): 2261–76.

Mohegh, Arash, Pablo Rosado, Ling Jin, Dev Millstein, Ronnen Levinson, and George Ban-Weiss. 2017. "Modeling the Climate Impacts of Deploying Solar Reflective Cool Pavements in California Cities." *Journal of Geophysical Research, D: Atmospheres* 122 (13): 6798–6817.

Moritz, Max A., Tadashi J. Moody, Meg A. Krawchuk, Mimi Hughes, and Alex Hall. 2010. "Spatial Variation in Extreme Winds Predicts Large Wildfire Locations in Chaparral Ecosystems." *Geophysical Research Letters* 37 (4). https://doi.org/10.1029/2009gl041735.

Morton, Lois Wright, Natalia Peres, Clyde Fraisse, and Mark Gleason. 2017. Climate, Weather and Strawberries. Sociology Technical Report 1047. Department of Sociology, Iowa State University, Ames, Iowa. 16 pp.

Moser, S. C. (2013). Navigating the political and emotional terrain of adaptation: Community engagement when climate change comes home. InL Moser SC, Boykoff MT (eds.). *Successful adaptation to climate change: Linking science and policy in a rapidly changing world*. New York, NY: Routledge. pp. 289–305.

Mote, Philip W., David E. Rupp, Sihan Li, Darrin J. Sharp, Friederike Otto, Peter F. Uhe, Mu Xiao, Dennis P. Lettenmaier, Heidi Cullen, and Myles R. Allen. 2016. "Perspectives on the Causes of Exceptionally Low 2015 Snowpack in the Western United States." *Geophysical Research Letters* 43 (20): 10,980–10,988.

Muchnick, Barry Ross. 2007. "Planting Nature: Trees and the Manipulation of Environmental Stewardship in America. By Shaul E. Cohen (Berkeley, University of California Press, 2004) 210 Pp. $34.95." *The Journal of Interdisciplinary History* 37 (4): 643–44.

Musselman, Keith N., Noah P. Molotch, and Steven A. Margulis. 2017. "Snowmelt Response to Simulated Warming across a Large Elevation Gradient, Southern Sierra Nevada, California." *The Cryosphere* 11 (6): 2847–66.

Myers, Norman, Russell A. Mittermeier, Cristina G. Mittermeier, Gustavo A. B. da Fonseca, and Jennifer Kent. 2000. "Biodiversity Hotspots for Conservation Priorities." *Nature* 403 (6772): 853–58.

Nahlik, Matthew J., and Mikhail V. Chester. 2014a. "Transit-Oriented Smart Growth Can Reduce Life-Cycle Environmental Impacts and Household Costs in Los Angeles." *Transport Policy* 35 (September): 21–30.

———. 2014b. "Transit-Oriented Smart Growth Can Reduce Life-Cycle Environmental Impacts and Household Costs in Los Angeles." *Transport Policy* 35 (September): 21–30.

Neelin, J. David, J. David Neelin, Baird Langenbrunner, Joyce E. Meyerson, Alex Hall, and Neil Berg. 2013. "California Winter Precipitation Change under Global Warming in the Coupled Model Intercomparison Project Phase 5 Ensemble." *Journal of Climate* 26 (17): 6238–56.

Neiman, Paul J., F. Martin Ralph, Gary A. Wick, Jessica D. Lundquist, and Michael D. Dettinger. 2008. "Meteorological Characteristics and Overland Precipitation Impacts of Atmospheric Rivers Affecting the West Coast of North America Based on Eight Years of SSM/I Satellite Observations." *Journal of Hydrometeorology* 9 (1): 22–47.

Neria, Y., A. Nandi, and S. Galea. 2008. "Post-Traumatic Stress Disorder Following Disasters: A Systematic Review." *Psychological Medicine* 38 (4): 467–80.

Newbold, Tim, Lawrence N. Hudson, Andrew P. Arnell, Sara Contu, Adriana De Palma, Simon Ferrier, Samantha L. L. Hill, et al. 2016. "Has Land Use Pushed Terrestrial Biodiversity beyond the Planetary Boundary? A Global Assessment." *Science* 353 (6296): 288–91.

O'Neill, Andrea, Li Erikson, Patrick Barnard, Patrick Limber, Sean Vitousek, Jonathan Warrick, Amy Foxgrover, and Jessica Lovering. 2018. "Projected 21st Century Coastal Flooding in the Southern California Bight. Part 1: Development of the Third Generation CoSMoS Model." *Journal of Marine Science and Engineering* 6 (2): 59.

Orsi, Jared. 2004. *Hazardous Metropolis: Flooding and Urban Ecology in Los Angeles*. Univ of California Press.

Ostro, Bart D., Lindsey A. Roth, Rochelle S. Green, and Rupa Basu. 2009. "Estimating the Mortality Effect of the July 2006 California Heat Wave." *Environmental Research* 109 (5): 614–19.

Parisien, Marc-André, and Max A. Moritz. 2009. "Environmental Controls on the Distribution of Wildfire at Multiple Spatial Scales." *Ecological Monographs* 79 (1): 127–54.

Parmesan, Camille, and Gary Yohe. 2003. "A Globally Coherent Fingerprint of Climate Change Impacts across Natural Systems." *Nature* 421 (6918): 37–42.

Pastor M, and Morello-Frosch R. 2014. Integrating Public Health and Community Development To Tackle Neighborhood Distress And Promote Well-Being. Health Affairs. Chevy Chase 33 (11): 1890–96.

Pataki, Diane E., Heather R. McCarthy, Elizaveta Litvak, and Stephanie Pincetl. 2011a. "Transpiration of Urban Forests in the Los Angeles Metropolitan Area." *Ecological Applications: A Publication of the Ecological Society of America* 21 (3): 661–77.

———. 2011b. "Transpiration of Urban Forests in the Los Angeles Metropolitan Area." *Ecological Applications: A Publication of the Ecological Society of America* 21 (3): 661–77.

Pathak, Tapan, Mahesh Maskey, Jeffery Dahlberg, Faith Kearns, Khaled Bali, and Daniele Zaccaria. 2018. "Climate Change Trends and Impacts on California Agriculture: A Detailed Review." *Agronomy* 8 (3): 25.

Payne, Ashley E., and Gudrun Magnusdottir. 2014. "Dynamics of Landfalling Atmospheric Rivers over the North Pacific in 30 Years of MERRA Reanalysis." *Journal of Climate* 27 (18): 7133–50.

Pendleton, Linwood, et al., 2012. Size matters: The economic value of beach erosion and nourishment in Southern California. *Contemporary Economic Policy*, 30(2), 223-237.

Peperzak, Louis. 2003. "Climate Change and Harmful Algal Blooms in the North Sea." *Acta Oecologica* 24: S139–44.

Peterson, Seth H., Max A. Moritz, Marco E. Morais, Philip E. Dennison, and Jean M. Carlson. 2013. "Modelling Long-Term Fire Regimes of Southern California Shrublands." *International Journal of Wildland Fire* 20 (1): 1.

Pettorelli, Nathalie. 2013. *The Normalized Difference Vegetation Index*.

Pfister, G. G., S. Walters, J-F Lamarque, J. Fast, M. C. Barth, J. Wong, J. Done, G. Holland, and C. L. Bruyère. 2014. "Projections of Future Summertime Ozone over the U.S." *Journal of Geophysical Research, D: Atmospheres* 119 (9): 5559–82.

Pickett, S. T. A., M. L. Cadenasso, J. M. Grove, Christopher G. Boone, Peter M. Groffman, Elena Irwin, Sujay S. Kaushal, et al. 2011. "Urban Ecological Systems: Scientific Foundations and a Decade of Progress." *Journal of Environmental Management* 92 (3): 331–62.

Pickett, S. T. A., M. L. Cadenasso, J. M. Grove, C. H. Nilon, R. V. Pouyat, W. C. Zipperer, and R. Costanza. 2001. "Urban Ecological Systems: Linking Terrestrial Ecological, Physical, and Socioeconomic Components of Metropolitan Areas." *Annual Review of Ecology and Systematics* 32 (1): 127–57.

Pierce, David W., Daniel R. Cayan, and Bridget L. Thrasher. 2014. "Statistical Downscaling Using Localized Constructed Analogs (LOCA)*." *Journal of Hydrometeorology* 15 (6): 2558–85.

Pierce, David W., Tapash Das, Daniel R. Cayan, Edwin P. Maurer, Norman L. Miller, Yan Bao, M. Kanamitsu, et al. 2012. "Probabilistic Estimates of Future Changes in California Temperature and Precipitation Using Statistical and Dynamical Downscaling." *Climate Dynamics* 40 (3-4): 839–56.

Pincetl, Stephanie. 2010a. "Implementing Municipal Tree Planting: Los Angeles Million-Tree Initiative." *Environmental Management* 45 (2): 227–38.

———. 2010b. "Implementing Municipal Tree Planting: Los Angeles Million-Tree Initiative." *Environmental Management* 45 (2): 227–38.

Pincetl, Stephanie, Erik Porse, and Deborah Cheng. 2016. "Fragmented Flows: Water Supply in Los Angeles County." *Environmental Management* 58 (2): 208–22.

Pincetl S, Gillespie T.W., Pataki D., Porse E., Jia S., Kidera E., Nobles N. Choi DH. 2017. Evaluating the effects of turf-replacement programs in Los Angeles County. The Metropolitan Water District of Southern California's Incentive Program. 2017. A report to the Metropolitan Water District of Southern California. July. California Center for Sustainable Communities, Institute of the Environment and Sustainability, UCLA.

Pincetl S., Rundel P.W., De Blasio J.C., Silver D., Scott T., Keeley J.E., Halsey R. 2008. Its the land use, not the fuels: Fires and land development in Southern California. Real Estate Review. 37: 25-42.

Polade, Suraj D., David W. Pierce, Daniel R. Cayan, Alexander Gershunov, and Michael D. Dettinger. 2014. "The Key Role of Dry Days in Changing Regional Climate and Precipitation Regimes." *Scientific Reports* 4 (1). https://doi.org/10.1038/srep04364.

Pomerantz, Melvin, Pablo J. Rosado, and Ronnen Levinson. 2015. "A Simple Tool for Estimating City-Wide Annual Electrical Energy Savings from Cooler Surfaces." *Urban Climate* 14: 315–25.

Porse, Erik (under review). 2018. "Merging Systems Analysis and Network Governance for Urban Water Resources." Under Review. Civil Engineering and Environmental Systems.

Porse, Erik, Madelyn Glickfeld, Keith Mertan, and Stephanie Pincetl. 2015. "Pumping for the Masses: Evolution of Groundwater Management in Metropolitan Los Angeles." *GeoJournal* 81 (5): 793–809.

Porse, Erik, Kathryn B. Mika, Elizaveta Litvak, Kimberly F. Manago, Terri S. Hogue, Mark Gold, Diane E. Pataki, and Stephanie Pincetl. 2018. "The Economic Value of Local Water Supplies in Los Angeles." *Nature Sustainability* 1 (6): 289–97.

Porse, Erik, Kathryn B. Mika, Elizaveta Litvak, Kimberly F. Manago, Kartiki Naik, Madelyn Glickfeld, Terri S. Hogue, Mark Gold, Diane E. Pataki, and Stephanie Pincetl. 2017. "Systems Analysis and Optimization of Local Water Supplies in Los Angeles." *Journal of Water Resources Planning and Management* 143 (9): 04017049.

Porse, Erik, Kathryn B. Mika, Rhianna Williams, Mark Gold, William Blomquist, and Stephanie Pincetl. 2018. "Groundwater Exchange Pools and Urban Water Supply Sustainability: Modeling Directed and Undirected Networks." *Journal of Water Resources Planning and Management* 144 (8): 04018040.

Post, Ellen S., Anne Grambsch, Chris Weaver, Philip Morefield, Jin Huang, Lai-Yung Leung, Christopher G. Nolte, et al. 2012. "Variation in Estimated Ozone-Related Health Impacts of Climate Change due to Modeling Choices and Assumptions." *Environmental Health Perspectives* 120 (11): 1559–64.

Pryor, S. C., and R. J. Barthelmie. 2010. "Climate Change Impacts on Wind Energy: A Review." *Renewable and Sustainable Energy Reviews* 14 (1): 430–37.

Purkey, D. R., B. Joyce, S. Vicuna, M. W. Hanemann, L. L. Dale, D. Yates, and J. A. Dracup. 2007. "Robust Analysis of Future Climate Change Impacts on Water for Agriculture and Other Sectors: A Case Study in the Sacramento Valley." *Climatic Change* 87 (S1): 109–22.

Radke, J.D, G.S. Biging, K. Roverts, M. Schmidt-Poolman, H. Foster, E. Roe, Y. Ju, S. Lindbergh, T. Beach, L. Maier, Y. He, M. Ashenfarb, P. Norton, M. Wray, A. Alruheil, S. Yi, R. Rau, J. Collins, D. Radke, M. Coufal, S. Marx, D. Moanga, V. Ulyashin, A. Dalal. (University of California, Berkeley). 2018. ***Assessing Extreme Weather-Related Vulnerability and Identifying Resilience Options for California's Independent Transportation Fuel Sector***. California's Fourth Climate Change Assessment, California Energy Commission. Publication Number: CCCA4-CEC-2018-012.

Ralph, F. Martin, F. Martin Ralph, Paul J. Neiman, Gary A. Wick, Seth I. Gutman, Michael D. Dettinger, Daniel R. Cayan, and Allen B. White. 2006. "Flooding on California's Russian River: Role of Atmospheric Rivers." *Geophysical Research Letters* 33 (13). https://doi.org/10.1029/2006gl026689.

Rasmussen, D. J., Jianlin Hu, Abdullah Mahmud, and Michael J. Kleeman. 2013. "The Ozone-Climate Penalty: Past, Present, and Future." *Environmental Science & Technology* 47 (24): 14258–66.

Rastogi, Bharat, A. Park Williams, Douglas T. Fischer, Sam F. Iacobellis, Kathryn McEachern, Leila Carvalho, Charles Jones, Sara A. Baguskas, and Christopher J. Still. 2016. "Spatial and Temporal Patterns of Cloud Cover and Fog Inundation in Coastal California: Ecological Implications." *Earth Interactions* 20 (15): 1–19.

Reed, Daniel, Libe Washburn, Andrew Rassweiler, Robert Miller, Tom Bell, and Shannon Harrer. 2016. "Extreme Warming Challenges Sentinel Status of Kelp Forests as Indicators of Climate Change." *Nature Communications* 7 (December): 13757.

Reid, Colleen E., Marie S. O'Neill, Carina J. Gronlund, Shannon J. Brines, Daniel G. Brown, Ana V. Diez-Roux, and Joel Schwartz. 2009a. "Mapping Community Determinants of Heat Vulnerability." *Environmental Health Perspectives* 117 (11): 1730–36.

———. 2009b. "Mapping Community Determinants of Heat Vulnerability." *Environmental Health Perspectives* 117 (11): 1730–36.

Riggs, Margaret A., Carol Y. Rao, Clive M. Brown, David Van Sickle, Kristin J. Cummings, Kevin H. Dunn, James A. Deddens, et al. 2008. "Resident Cleanup Activities, Characteristics of Flood-Damaged Homes and Airborne Microbial Concentrations in New Orleans, Louisiana, October 2005." *Environmental Research* 106 (3): 401–9.

Riordan, Erin C., Thomas W. Gillespie, Lincoln Pitcher, Stephanie S. Pincetl, G. Darrel Jenerette, and Diane E. Pataki. 2014. "Threats of Future Climate Change and Land Use to Vulnerable Tree Species Native to Southern California." *Environmental Conservation* 42 (02): 127–38.

Riordan, Erin C., and Philip W. Rundel. 2009. "Modelling the Distribution of a Threatened Habitat: The California Sage Scrub." *Journal of Biogeography* 36 (11): 2176–88.

Rolshausen, Philippe E.; Mary Lu Arpaia; and Ben Faber. 2015. "High Density Planting for Avocado Production: A Chilean Perspective." From The Grove, Fall 2016. California Avocado Commission. http://ucanr.edu/sites/Rolshausen/files/248917.pdf

Rudolph L, Gould S, Berko J. Climate Change, Health, and Equity: Opportunities for Action. 2015. Public Health Institute, Oakland, CA.

Rundel, Philip W. 2018. "California Chaparral and Its Global Significance." In *Springer Series on Environmental Management*, 1–27.

Sacks, Jason D., Lindsay Wichers Stanek, Thomas J. Luben, Douglas O. Johns, Barbara J. Buckley, James S. Brown, and Mary Ross. 2011. "Particulate Matter-Induced Health Effects: Who Is Susceptible?" *Environmental Health Perspectives* 119 (4): 446–54.

Sadd JL, Pastor M, Morello–Frosch R, Scoggins J, Jesdale B. Playing it Safe: Assessing Cumulative Impact and Social Vulnerability through an Environmental Justice Screening Method in the South Coast Air Basin, California. International Journal of Environmental Research and Public Health. 2011. 8:1441–1159.

Sailor, D. 1997. "Sensitivity of Electricity and Natural Gas Consumption to Climate in the U.S.A.—Methodology and Results for Eight States." *Energy* 22 (10): 987–98.

———. 2003. "Air Conditioning Market Saturation and Long-Term Response of Residential Cooling Energy Demand to Climate Change." *Energy* 28 (9): 941–51.

Santamouris, M. 2013. "Using Cool Pavements as a Mitigation Strategy to Fight Urban Heat island—A Review of the Actual Developments." *Renewable and Sustainable Energy Reviews* 26 (October): 224–40.

Sathaye, J. A., L. L. Dale, P. H. Larsen, G. A. Fitts, K. Koy, S. M. Lewis, and Andre Frossard Pereira de Lucena. 2013. "Rising Temps, Tides, and Wildfires: Assessing the Risk to California's Energy Infrastructure from Projected Climate Change." *IEEE Power and Energy Magazine* 11 (3): 32–45.

Schneider, E., R. A. Hajjeh, R. A. Spiegel, R. W. Jibson, E. L. Harp, G. A. Marshall, R. A. Gunn, et al. 1997. "A Coccidioidomycosis Outbreak Following the Northridge, Calif, Earthquake." *JAMA: The Journal of the American Medical Association* 277 (11): 904–8.

Schroeder, Heike, and Harriet Bulkeley. 2009. "Global Cities and the Governance of Climate Change: What Is the Role of Law in Cities." *Fordham Urb. LJ* 36: 313.

Schwartz B, Terashita D. 2017. Increased Coccidioidomycosis ("Valley Fever") in Los Angeles County. Rx for Prevention, July-August 2017. Retrieved from http://rx.ph.lacounty.gov/RxCocci0717#cocciref1

Schwartz, Henry G., Michael Meyer, Cynthia J. Burbank, Michael Kuby, Clinton Oster, John Posey, Edmond J. Russo, and Arthur Rypinski. 2014. "Ch. 5: Transportation." In *Climate Change Impacts in the United States: The Third National Climate Assessment*, edited by Jerry M. Melillo, Terese (T C) Richmond, and Gary W. Yohe, 130–49. U.S. Global Change Research Program.

Shamasunder B, Collier-Oxandale A, Blickley J, Sadd J, Chan M, Navarro S, Hannigan M, Wong Nicole J. 2018. Community-Based Health and Exposure Study around Urban Oil Developments in South Los Angeles. International Journal of Environmental Research and Public Health. January 15, 2018 www.mdpi.com/1660-4601/15/1/138/pdf (accessed March 7, 2018)

Seager, Richard, Martin Hoerling, Siegfried Schubert, Hailan Wang, Bradfield Lyon, Arun Kumar, Jennifer Nakamura, and Naomi Henderson. 2014. *Causes and Predictability of the 2011-14 California Drought: Assessment Report*.

———. 2015. "Causes of the 2011–14 California Drought*." *Journal of Climate* 28 (18): 6997–7024.

Sheng, Jingfen, and John P. Wilson. 2008. "Watershed Urbanization and Changing Flood Behavior across the Los Angeles Metropolitan Region." *Natural Hazards* 48 (1): 41–57.

———. 2009. "Watershed Urbanization and Changing Flood Behavior across the Los Angeles Metropolitan Region." *Natural Hazards* 48 (1): 41–57.

Sherwood, S., and Q. Fu. 2014. "A Drier Future?" *Science* 343 (6172): 737–39.

Shiflett, Sheri A., Liyin L. Liang, Steven M. Crum, Gudina L. Feyisa, Jun Wang, and G. Darrel Jenerette. 2017. "Variation in the Urban Vegetation, Surface Temperature, Air Temperature Nexus." *The Science of the Total Environment* 579 (February): 495–505.

Shirzaei, Manoochehr, and Roland Bürgmann. 2018. "Global Climate Change and Local Land Subsidence Exacerbate Inundation Risk to the San Francisco Bay Area." *Science Advances* 4 (3): eaap9234.

Shonkoff, Seth B., Rachel Morello-Frosch, Manuel Pastor, and James Sadd. 2011a. "The Climate Gap: Environmental Health and Equity Implications of Climate Change and Mitigation Policies in California—a Review of the Literature." *Climatic Change* 109 (1): 485–503.

———. 2011b. "The Climate Gap: Environmental Health and Equity Implications of Climate Change and Mitigation Policies in California—a Review of the Literature." *Climatic Change* 109 (1): 485–503.

Shuster, W. D., J. Bonta, H. Thurston, E. Warnemuende, and D. R. Smith. 2005. "Impacts of Impervious Surface on Watershed Hydrology: A Review." *Urban Water Journal* 2 (4): 263–75.

Simons, G. and J. McCabe (2005) "California Solar Resources". CEC-500-2005-072-D, http://www.energy.ca.gov/2005publications/CEC-500-2005-072/CEC-500-2005-072-D.PDF

Smith, Jayson R., Peggy Fong, and Richard F. Ambrose. 2006. "Dramatic Declines in Mussel Bed Community Diversity: Response to Climate Change?" *Ecology* 87 (5): 1153–61.

Smith, P.E. (1995): A warm decade in the southern California Bight. CalCOFI Report, Vol.36, 1995, pp 120-126. http://calcofi.org/publications/calcofireports/v36/Vol_36_Smith_1.pdf

Smoyer-Tomic, Karen E., Robyn Kuhn, and Alana Hudson. 2003. "Heat Wave Hazards: An Overview of Heat Wave Impacts in Canada." *Natural Hazards* 28 (2-3): 465–86.

Soule (et al), M. n.d. *Reconstructed Dynamics of Rapid Extinctions of Chaparral-Requiring Birds in Urban Habitat Islands*.

Soulé, M. E., Bolger, D. T., Alberts, A. C., Wrights, J., Sorice, M., & Hill, S. 1988. Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. *Conservation Biology* 2(1): 75-92.

Spang, Edward S., Andrew J. Holguin, and Frank J. Loge. 2018. "The Estimated Impact of California's Urban Water Conservation Mandate on Electricity Consumption and Greenhouse Gas Emissions." *Environmental Research Letters: ERL [Web Site]* 13 (1): 014016.

Spang, Edward S., and Frank J. Loge. 2015. "A High-Resolution Approach to Mapping Energy Flows through Water Infrastructure Systems." *Journal of Industrial Ecology* 19 (4): 656–65.

Spracklen, D. V., L. J. Mickley, J. A. Logan, R. C. Hudman, R. Yevich, M. D. Flannigan, and A. L. Westerling. 2009. "Impacts of Climate Change from 2000 to 2050 on Wildfire Activity and Carbonaceous Aerosol Concentrations in the Western United States." *Journal of Geophysical Research* 114 (D20). https://doi.org/10.1029/2008jd010966.

Sriver, Ryan L., Robert J. Lempert, Per Wikman-Svahn, and Klaus Keller. 2018. "Characterizing Uncertain Sea-Level Rise Projections to Support Investment Decisions." *PloS One* 13 (2): e0190641.

State of California. n.d. "Urban Heat Island Interactive Maps | CalEPA." Accessed February 28, 2018. https://calepa.ca.gov/climate/urban-heat-island-index-for-california/urban-heat-island-interactive-maps/.

State of California, Department of Justice, Office of the Attorney General. Environmental Justice at the Local and Regional Level Legal Background Updated July 10, 2012. (https://oag.ca.gov/sites/all/files/agweb/pdfs/environment/ej_fact_sheet.pdf (accessed March 7, 2018)

State of California. Gov. Code, § 65040.12, subd. (e). https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=65040.12. (accessed March 7, 2018)

Steiner, Allison L., Shaheen Tonse, Ronald C. Cohen, Allen H. Goldstein, and Robert A. Harley. 2006. "Influence of Future Climate and Emissions on Regional Air Quality in California." *Journal of Geophysical Research* 111 (D18). https://doi.org/10.1029/2005jd006935.

Stoms, David, Guido Franco, Heather Raitt, Susan Wilhelm, Sekita Grant. 2013. Climate Change and the California Energy Sector. California Energy Commission. Publication Number CEC-100-2013-002.

Stone, Brian, Jeremy J. Hess, and Howard Frumkin. 2010. "Urban Form and Extreme Heat Events: Are Sprawling Cities More Vulnerable to Climate Change than Compact Cities?" *Environmental Health Perspectives* 118 (10): 1425–28.

Sun, Fengpeng, Daniel B. Walton, and Alex Hall. 2015. "A Hybrid Dynamical–Statistical Downscaling Technique. Part II: End-of-Century Warming Projections Predict a New Climate State in the Los Angeles Region." *Journal of Climate* 28 (12): 4618–36.

Swain, D.L., B. Langenbrunner, J.D. Neelin, and A. Hall, "Increasing precipitation volatility in 21st century California" (in press, Nature Climate Change, 2018).

Swain, Daniel L. 2015. "A Tale of Two California Droughts: Lessons amidst Record Warmth and Dryness in a Region of Complex Physical and Human Geography." *Geophysical Research Letters* 42 (22): 9999–10,003.

Swain, Daniel L., Daniel E. Horton, Deepti Singh, and Noah S. Diffenbaugh. 2016. "Trends in Atmospheric Patterns Conducive to Seasonal Precipitation and Temperature Extremes in California." *Science Advances* 2 (4): e1501344.

Sweet, William Vanderveer. 2017. *Global and Regional Sea Level Rise Scenarios for the United States*.

Syphard, Alexandra D., Teresa J. Brennan, and Jon E. Keeley. 2017. "The Importance of Building Construction Materials Relative to Other Factors Affecting Structure Survival during Wildfire." *International Journal of Disaster Risk Reduction* 21: 140–47.

———. 2018. "Chaparral Landscape Conversion in Southern California." In *Springer Series on Environmental Management*, 323–46.

Syphard, Alexandra D., Jon E. Keeley, and Teresa J. Brennan. 2011. "Factors Affecting Fuel Break Effectiveness in the Control of Large Fires on the Los Padres National Forest, California." *International Journal of Wildland Fire* 20 (6): 764.

Syphard, Alexandra D., Jon E. Keeley, Anne H. Pfaff, and Ken Ferschweiler. 2017. "Human Presence Diminishes the Importance of Climate in Driving Fire Activity across the United States." *Proceedings of the National Academy of Sciences* 114 (52): 13750–55.

Syphard, Alexandra D., Volker C. Radeloff, Jon E. Keeley, Todd J. Hawbaker, Murray K. Clayton, Susan I. Stewart, and Roger B. Hammer. 2007. "Human Influence on California Fire Regimes." *Ecological Applications: A Publication of the Ecological Society of America* 17 (5): 1388–1402.

Taha, Haider. 1997a. "Modeling the Impacts of Large-Scale Albedo Changes on Ozone Air Quality in the South Coast Air Basin." *Atmospheric Environment* 31 (11): 1667–76.

———. 1997b. "Urban Climates and Heat Islands: Albedo, Evapotranspiration, and Anthropogenic Heat." *Energy and Buildings* 25 (2): 99–103.

———. 2008a. "Meso-Urban Meteorological and Photochemical Modeling of Heat Island Mitigation." *Atmospheric Environment* 42 (38): 8795–8809.

———. 2008b. "Urban Surface Modification as a Potential Ozone Air-Quality Improvement Strategy in California: A Mesoscale Modelling Study." *Boundary-Layer Meteorology* 127 (2): 219–39.

———. 2015a. "Cool Cities: Counteracting Potential Climate Change and Its Health Impacts." *Current Climate Change Reports* 1 (3): 163–75.

———. 2015b. "Meteorological, Air-Quality, and Emission-Equivalence Impacts of Urban Heat Island Control in California." *Sustainable Cities and Society* 19: 207–21.

Taha, Haider, Steven Konopacki, and Hashem Akbari. 1998. "Impacts of Lowered Urban Air Temperatures on Precursor Emission and Ozone Air Quality." *Journal of the Air & Waste Management Association* 48 (9): 860–65.

Taleghani, Mohammad, David Sailor, and George A. Ban-Weiss. 2016a. "Micrometeorological Simulations to Predict the Impacts of Heat Mitigation Strategies on Pedestrian Thermal Comfort in a Los Angeles Neighborhood." *Environmental Research Letters: ERL [Web Site]* 11 (2): 024003.

———. 2016b. "Micrometeorological Simulations to Predict the Impacts of Heat Mitigation Strategies on Pedestrian Thermal Comfort in a Los Angeles Neighborhood." *Environmental Research Letters: ERL [Web Site]* 11 (2): 024003.

Tanaka, Stacy K., Tingju Zhu, Jay R. Lund, Richard E. Howitt, Marion W. Jenkins, Manuel A. Pulido, Mélanie Tauber, Randall S. Ritzema, and Inês C. Ferreira. 2006. "Climate Warming and Water Management Adaptation for California." *Climatic Change* 76 (3-4): 361–87.

Tebaldi, C., B. H. Strauss, and C. E. Zervas 2012, Modelling sea level rise impacts on storm surges along US coasts, Environmental Research Letters, 7(1), 014032.

Tegner, M.J., P. Dayton, P. Edwards, and K. Riser,1996: long-term change in kelp forests. CalCOFl Rep., Vol. 37, pp 111-126. http://calcofi.org/publications/calcofireports/v37/Vol_37_Tegner_etal.pdf

Thorne, Karen, Glen MacDonald, Glenn Guntenspergen, Richard Ambrose, Kevin Buffington, Bruce Dugger, Chase Freeman, et al. 2018. "U.S. Pacific Coastal Wetland Resilience and Vulnerability to Sea-Level Rise." *Science Advances* 4 (2): eaao3270.

Thorne, Karen M., Glen M. MacDonald, Rich F. Ambrose, Kevin J. Buffington, Chase M. Freeman, Christopher N. Janousek, Lauren N. Brown, et al. 2016. "Effects of Climate Change on Tidal Marshes along a Latitudinal Gradient in California." *Open-File Report*. https://doi.org/10.3133/ofr20161125.

Tiitanen, P., K. l. Timonen, J. J. Ruskanen, A. Mirme, and J. Pekkanen. 1999. "Fine Particulate Air Pollution, Resuspended Road Dust and Respiratory Health among Symptomatic Children." *The European Respiratory Journal: Official Journal of the European Society for Clinical Respiratory Physiology* 13 (2): 266–73.

Trenberth, K. E. 2011. "Changes in Precipitation with Climate Change." *Climate Research* 47 (1): 123–38.

Trumble, John T., and Casey D. Butler. 2008. "Climate Change Will Exacerbate California's Insect Pest Problems." *California Agriculture* 63 (2): 73–78.

Tsuzuki-Hayakawa, Kazuyo, Yutaka Tochihara, and Tadakatsu Ohnaka. 1995. "Thermoregulation during Heat Exposure of Young Children Compared to Their Mothers." *European Journal of Applied Physiology and Occupational Physiology* 72 (1-2): 12–17.

Underwood, Emma C., Joshua H. Viers, Kirk R. Klausmeyer, Robin L. Cox, and M. Rebecca Shaw. 2009. "Threats and Biodiversity in the Mediterranean Biome." *Diversity and Distributions* 15 (2): 188–97.

United States Environmental Protection Agency. 2013. Integrated Science Assessment for Ozone and Related Photochemical Oxidants. EPA 600/R-10/076F | February 2013. Retrieved from file:///C:/Users/e526794/Downloads/OZONE_FINAL_ISA_2013.PDF

Vahmani, P., and G. Ban-Weiss. 2016. "Climatic Consequences of Adopting Drought-Tolerant Vegetation over Los Angeles as a Response to California Drought." *Geophysical Research Letters* 43 (15): 8240–49.

Vahmani, P., F. Sun, A. Hall, and G. Ban-Weiss. 2016. "Investigating the Climate Impacts of Urbanization and the Potential for Cool Roofs to Counter Future Climate Change in Southern California." *Environmental Research Letters: ERL [Web Site]* 11 (12): 124027.

Vallianatos M, Shamasunder B, Gottlieb R. 2013. Metrics for Tracking Climate Change Adaptation: A Report to the Los Angeles County Metropolitan Transportation. April 1, 2013. http://scholar.oxy.edu/cgi/viewcontent.cgi?article=1461&context=uep_faculty (accessed March 7, 2018)

Vicuna, S., and J. A. Dracup. 2007. "The Evolution of Climate Change Impact Studies on Hydrology and Water Resources in California." *Climatic Change* 82 (3-4): 327–50.

Vicuna, S., R. Leonardson, M. W. Hanemann, L. L. Dale, and J. A. Dracup. 2007. "Climate Change Impacts on High Elevation Hydropower Generation in California's Sierra Nevada: A Case Study in the Upper American River." *Climatic Change* 87 (S1): 123–37.

Vilchis, L. Ignacio, L. Ignacio Vilchis, Mia J. Tegner, James D. Moore, Carolyn S. Friedman, Kristin L. Riser, Thea T. Robbins, and Paul K. Dayton. 2005. "OCEAN WARMING EFFECTS ON GROWTH, REPRODUCTION, AND SURVIVORSHIP OF SOUTHERN CALIFORNIA ABALONE." *Ecological Applications: A Publication of the Ecological Society of America* 15 (2): 469–80.

Vitousek, Sean, Patrick L. Barnard, and Patrick Limber. 2017. "Can Beaches Survive Climate Change?" *Journal of Geophysical Research: Earth Surface* 122 (4): 1060–67.

Vuuren, Detlef P. van, Jae Edmonds, Mikiko Kainuma, Keywan Riahi, Allison Thomson, Kathy Hibbard, George C. Hurtt, et al. 2011. "The Representative Concentration Pathways: An Overview." *Climatic Change* 109 (1-2): 5–31.

Wang, Yafei, Frank Bakker, Rudolf de Groot, Heinrich Wortche, and Rik Leemans. 2015. "Effects of Urban Trees on Local Outdoor Microclimate: Synthesizing Field Measurements by Numerical Modelling." *Urban Ecosystems* 18 (4): 1305–31.

Warner, Michael D., Clifford F. Mass, and Eric P. Salathé. 2015. "Changes in Winter Atmospheric Rivers along the North American West Coast in CMIP5 Climate Models." *Journal of Hydrometeorology* 16 (1): 118–28.

Watts N, Adger WN, Agnolucci P, Blackstock J, Byass P, Cai W, Chaytor S, Colbourn R, Collins M,…Costello A. 2015. Health and climate change: policy response to protect public health. The Lancet 386(10006):7-13.

Westerling, Anthony Leroy. (University of California, Merced). 2018. ***Wildfire Simulations for the Fourth California Climate Assessment: Projecting Changes in Extreme Wildfire Events with a Warming Climate.*** California's Fourth Climate Change Assessment, California Energy Commission. Publication number: CCCA4-CEC-2018-014.

Willems, Patrick, Peter Molnar, Thomas Einfalt, Karsten Arnbjerg-Nielsen, Christian Onof, Van-Thanh-Van Nguyen, and Paolo Burlando. 2012. "Rainfall in the Urban Context: Forecasting, Risk and Climate Change." *Atmospheric Research* 103: 1–3.

Williams, A. Park, A. Park Williams, Rachel E. Schwartz, Sam Iacobellis, Richard Seager, Benjamin I. Cook, Christopher J. Still, Gregory Husak, and Joel Michaelsen. 2015. "Urbanization Causes Increased Cloud Base Height and Decreased Fog in Coastal Southern California." *Geophysical Research Letters* 42 (5): 1527–36.

Williams, A. Park, A. Park Williams, Richard Seager, John T. Abatzoglou, Benjamin I. Cook, Jason E. Smerdon, and Edward R. Cook. 2015. "Contribution of Anthropogenic Warming to California Drought during 2012-2014." *Geophysical Research Letters* 42 (16): 6819–28.

Williams, James H., Andrew DeBenedictis, Rebecca Ghanadan, Amber Mahone, Jack Moore, William R. Morrow 3rd, Snuller Price, and Margaret S. Torn. 2012. "The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity." *Science* 335 (6064): 53–59.

Wolstein J, Meng Y-Y, Babey S. 2010. Income disparities in asthma burden and care in California. UCLA Center for Health Policy Research. Retrieved from http://healthpolicy.ucla.edu/publications/Documents/PDF/Income%20Disparities%20in%20Asthma%20Burden%20and%20Care%20in%20California.pdf

Woodhouse, Connie A., David M. Meko, Glen M. MacDonald, Dave W. Stahle, and Edward R. Cook. 2010. "A 1,200-Year Perspective of 21st Century Drought in Southwestern North America." *Proceedings of the National Academy of Sciences of the United States of America* 107 (50): 21283–88.

Yang, Christopher, Sonia Yeh, Saleh Zakerinia, Kalai Ramea, and David McCollum. 2015. "Achieving California's 80% Greenhouse Gas Reduction Target in 2050: Technology, Policy and Scenario Analysis Using CA-TIMES Energy Economic Systems Model." *Energy Policy* 77 (February): 118–30.

Yue, Xu, Loretta J. Mickley, Jennifer A. Logan, and Jed O. Kaplan. 2013. "Ensemble Projections of Wildfire Activity and Carbonaceous Aerosol Concentrations over the Western United States in the Mid-21st Century." *Atmospheric Environment* 77 (October): 767–80.

Zalom, F.G.; M.P. Bolda; S.K. Dara; and S. Joseph. "Spider Mites". In UC IPM Pest Management Guidelines: Strawberry. UC ANR Publication 3468. http://ipm.ucanr.edu/PMG/r734400111.html

Zhang J**,** Mohegh A, Li Y, Levinson R, Ban-Weiss GA 2018 (in review). Systematic comparison of the influence of cool wall versus cool roof adoption on urban climate in the Los Angeles basin.

Zhao, Lei, Michael Oppenheimer, Qing Zhu, Jane W. Baldwin, Kristie L. Ebi, Elie Bou-Zeid, Kaiyu Guan, and Xu Liu. 2018. "Interactions between Urban Heat Islands and Heat Waves." *Environmental Research Letters: ERL [Web Site]* 13 (3): 034003.

Zhao, Zhan, Shu-Hua Chen, Michael J. Kleeman, and Abdullah Mahmud. 2011. "The Impact of Climate Change on Air Quality–Related Meteorological Conditions in California. Part II: Present versus Future Time Simulation Analysis." *Journal of Climate* 24 (13): 3362–76.

Zhou, Qianqian, Toke Emil Panduro, Bo Jellesmark Thorsen, and Karsten Arnbjerg-Nielsen. 2013. "Adaption to Extreme Rainfall with Open Urban Drainage System: An Integrated Hydrological Cost-Benefit Analysis." *Environmental Management* 51 (3): 586–601.

Zippay, Mackenzie L., and Brian Helmuth. 2012. "Effects of Temperature Change on Mussel, Mytilus." *Integrative Zoology* 7 (3): 312–27.